MARCH 1, 1958
VOL. 154—NO. 9

# Telephony

THE JOURNAL OF THE TELEPHONE INDUSTRY

Published every week on Saturday by TELEPHONY PUBLISHING CORP. 608 S. Dearborn St., Chicago 5, Ill. Subscription $4.00 per year. Entered as second class matter at the Post Office at Chicago, Ill., under the act of Mar. 3, 1879.

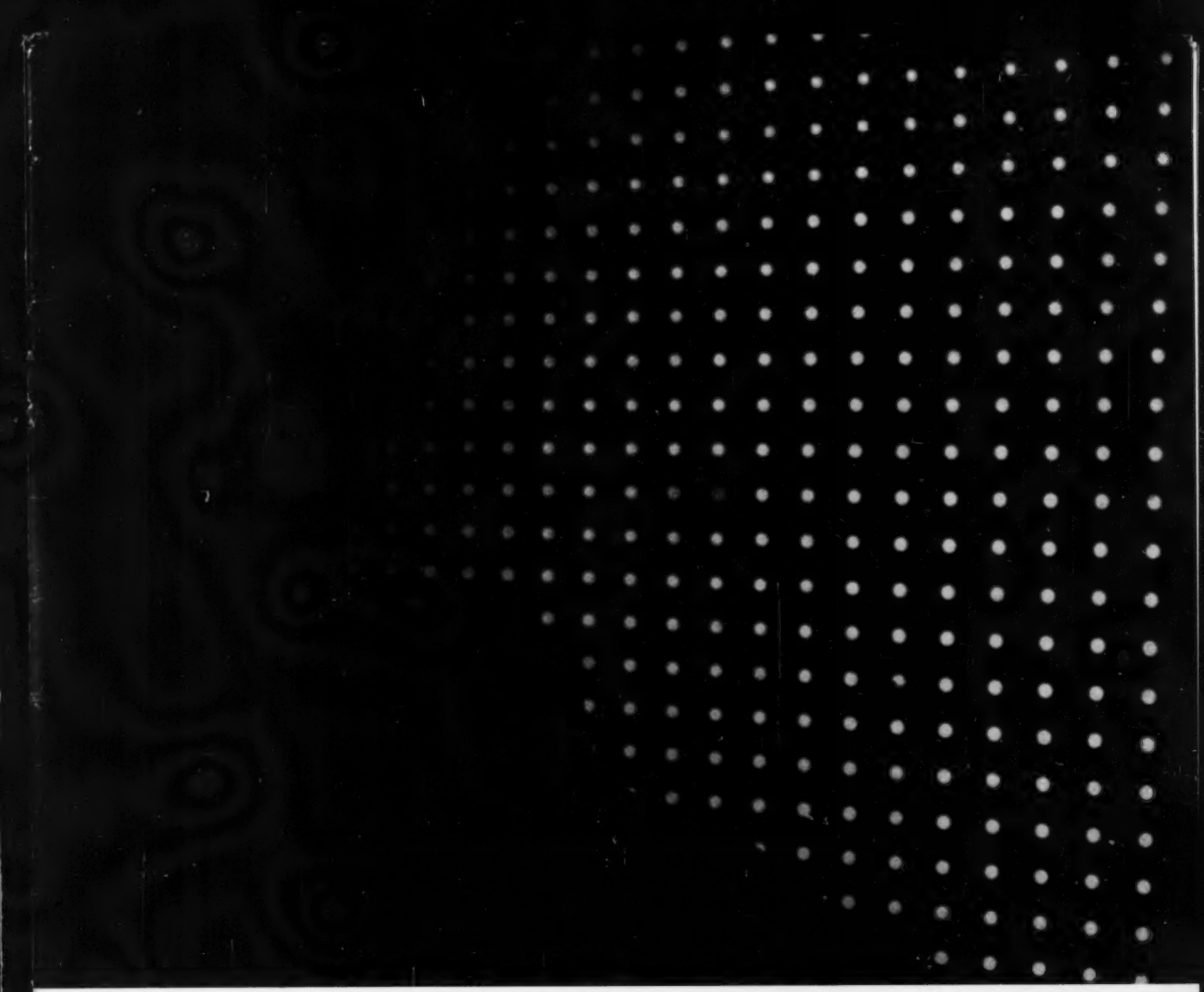
VAC Guaranteed Circulation This Issue 12,283 of Which 11,708 Is Paid

**DIRECTORY MERCHANDISING**

**Here is a fresh approach to reminding subscribers that a new telephone directory is soon to be delivered. General Telephone Co. of California's Santa Monica and Malibu exchange area directory is displayed by Kristin Granger.**

MANAGEMENT • PLANT • TRAFFIC • COMMERCIAL • LEGAL • ACCOUNTING

● COMPACT...You save space because it's double-sided! In XY Dial switching equipment, switches and circuit plates are mounted on both sides of the equipment bay frames. What's more, the XY® Universal Switch takes only 20 square inches of mounting space. This compactness means a saving of 748 square feet (13.6%)



in a typical 4,200-line 6,000-terminal XY Dial exchange. This kind of saving applies to <u>your</u> exchange, no matter how large or small. With building costs skyrocketing, Stromberg-Carlson equipment means real economy in your modernization program.

**STROMBERG-CARLSON** A DIVISION OF GENERAL DYNAMICS CORPORATION

ELECTRONIC AND COMMUNICATION PRODUCTS FOR HOME, INDUSTRY AND DEFENSE

# FLASHES AND PLUGS

**LITTLE MORE EXPLICIT, PLEASE.** The United Press reports that an excited Dayton, O. woman called the police to report an accident. Asked where it was, she said "I don't have time to talk about it now. I'll tell you when they get here." Then she hung up.

•

**PREFERS SEA TO AIR.** From Mickleover, England comes the story of 13-year-old Lloyd Lee, who volunteered to be the world's first sputnik boy and changed his mind.

Young Lloyd had been informed that the Soviets would fork over $140,000 a head for sputnik riders. Ambitious Lloyd immediately wrote a letter volunteering his services.

Several days later he received a letter headed "Russian Embassy" and typed in red. The note informed him that he had been chosen as a prospective sputnik jockey and added: "You will be required to do some training in Siberia. Our agents will be contacting you within the next few days to take you away for training."

The news was too much for Lloyd. He fainted.

His frightened mother summoned his father from work to guard Lloyd from the Soviets, and telephoned the police.

A detective assigned to the case was able to trace the note paper used on the letter to an upper grade classroom at Lloyd's school. More conclusive yet, certain upper classmen confessed the letter writing escapade.

Greatly relieved, Lloyd's mother told reporters: "Lloyd no longer wants to be a spaceman. He now wants to join the navy."

•

**SUBSCRIBERS ANONYMOUS.** An uprising recently took place in Paris on a minor scale, according to the United Press. The "Association of Victims of the Telephone" demanded that the French government abolish a tax on subscribers who refuse to have their numbers listed.

The group says it represents 100,000 anonymous telephone subscribers who want to stay that way.

•

**TENNESSEE TALES.** Kelly McNish, president of the Inter-Mountain Telephone Co., Bristol, Tenn. writes to tell us about the subscriber in Johnson City who wanted the welfare department. He asked the information operator for the number of "the farewell department." The information operator promptly had him connected with the local undertaker.

In another anecdote, Mr. McNish informs us that during Inter-Mountain's recent extension campaign one of the girls was attempting to sell a lady an extension and was turned down. However, the subscriber suggested that the saleswoman see the customer's husband and sell him an extension because he needed one.

**CHANGE OF ADDRESS**

Please notify your local postmaster and the Circulation Dept. of TELEPHONY of change of address. Change cannot be made without the old as well as the new address. Allow three weeks for change of address to become effective.


# Telephony

THE JOURNAL OF THE TELEPHONE INDUSTRY
*Since 1901*

**March 1, 1958**


CONTENTS


IN THE NATION'S CAPITAL ..... 17
*By Francis X. Welch*

BUSINESS NEEDS BASIC RESEARCH ..... 20
*By Frederick R. Kappel*

THE PLANT MAN'S NOTEBOOK ..... 24
*By Ray Blain*

PLANT MAN'S QUIZ ..... 26
*By Ray Blain*

REGISTRATION OPEN FOR USITA ENGINEERING COURSE ..... 27

THE OPERATOR'S CORNER ..... 28
*By Mayme Workman*

TROUBLE CLEARING—OUR SCHOOLS AND PUBLIC OPINION—Part 63 ..... 30
*By L. N. Martin*

NEW DEVELOPMENTS IN INDEPENDENT TELEPHONY—Part 5 ..... 32
*By Ray Blain*

TODAY'S HIGHLIGHTS OF FINANCE, TAXES, BUSINESS TRENDS ..... 34
*By Willard F. Stanley*

TELEPHONY'S TRAFFIC ENGINEERING HANDBOOK ..... 39
*By Gilbert R. Brockett*

COURTS AND COMMISSIONS ..... 43

NEWS ON NEW PRODUCTS ..... 62

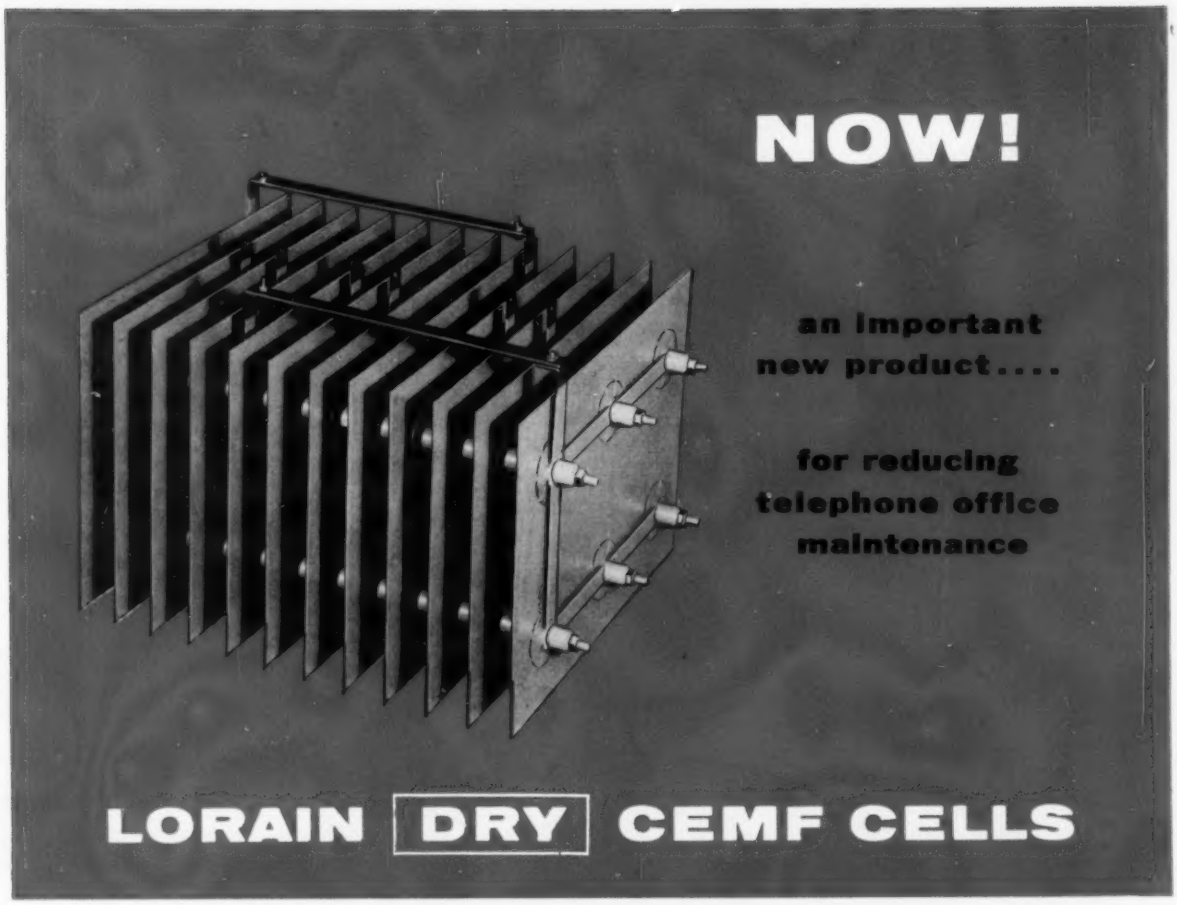


H. D. FARGO JR., *President and Director of Advertising* • A. J. STULTS, *Vice President and Advertising Manager* • R. C. RENO, *Vice President and Editor* • DAN S. FARGO, *Vice President and Managing Editor* • FRANCES E. CRETCHER, *Associate Editor* • FRANCIS X. WELCH, *Washington Editor* • RAY BLAIN, *Technical Editorial Director* • HAROLD B. McKAY, *Electronics Editor* • MAYME WORKMAN, *Traffic Editor* • VIVIAN RYDEN, *Circulation Manager*.

VAC VERIFIED AUDIT CIRCULATION



Published every week on Saturday by TELEPHONY PUBLISHING CORP., 608 S. Dearborn St., Chicago 5, Ill. Entered as second class matter at the Post Office at Chicago, Ill., under the act of Mar. 3, 1879. 25c per copy (except special issues—40c). Subscription $4.00, 1-year; $6.50, 2-years; $8.50, 3-years. Add $1.00 per year for postage to Canada and Pan American countries; $2.00 per year to Foreign countries. Telephone WAbash 2-2435.




## UNRESTRICTED RANGE OF VOLTAGE AND CURRENT RATINGS

- no routine maintenance
- light weight, portable
- mounts in any position
- not damaged by freezing
- non-corrosive
- obtainable in any size

Now available in all sizes, Lorain Dry CEMF Cells eliminate the maintenance problems associated with liquid-filled cells. Their light weight, portability, safety, and their unrestricted range of voltage and current ratings also adapt them for use as voltage regulating elements in many applications in which wet cells could not be used. They do not give off gases, do not employ liquids, are relatively insensitive to shock, and do not require maintenance or periodic attention. Lorain Dry CEMF Cells, therefore, can be installed wherever most convenient, making possible considerable economies in wiring, mounting racks, and floor space

Lorain Dry CEMF Cells are selenium covered metal plates, specially treated so their internal resistance decreases rapidly as the current flow through them increases, making them effective as voltage regulators. The amount of voltage drop is determined by the number of plates connected in series. Bulletin 176 lists representative sizes; assemblies to meet individual specifications are readily made to order. Specific recommendations will be made upon receipt of the current and voltage limits to be met, and the preferred mounting arrangement.

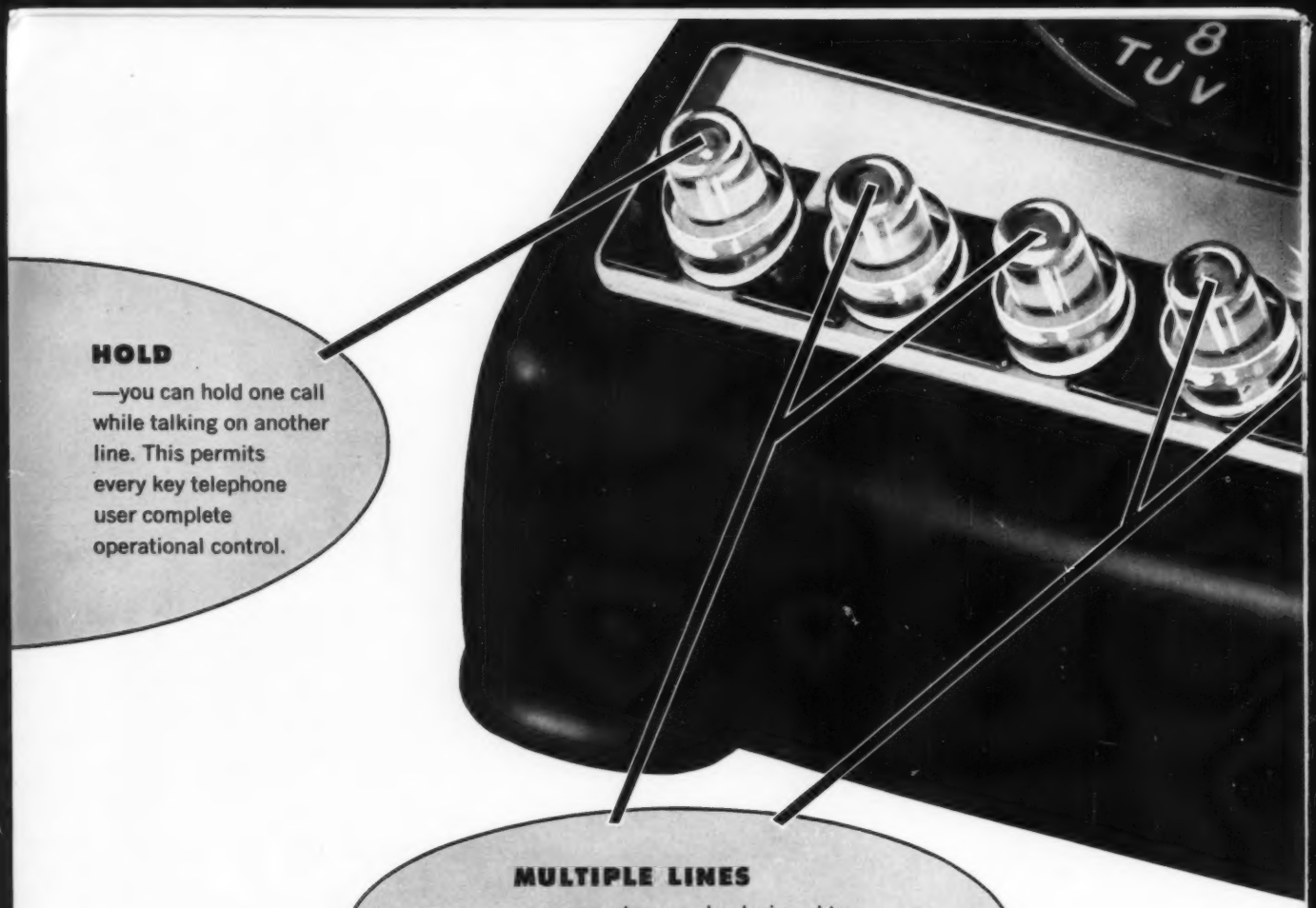
POWER EQUIPMENT FOR COMMUNICATIONS AND INDUSTRY

our equipment is sold through leading telephone distributors

FLOTROL SUB-CYCLE

**LORAIN** *Products Corporation*

1122 F Street Lorain, Ohio Phone: ATlantic 8-9191




**HOLD**
—you can hold one call while talking on another line. This permits every key telephone user complete operational control.

**MULTIPLE LINES**
—your system can be designed to select as many as four central office or PBX lines, thus affording maximum use at all times.

# IT'S THE BIG

**It's BIG saleswise.** *1A1 Type key systems are selling faster than any other type in the nation. Subscribers in independent areas want the best, too, and they get it with the K1A1.*

**It's BIG featurewise.** *Kellogg's K1A1 has all the important features which have made 1A1 systems so popular, including dial intercommunication, and illuminated buttons.*

**But it's SMALL in size and cost.** *The K1A1 key systems is engineered to be easy to install. It occupies a minimum of wall space. And it's rugged equipment . . . maintenance calls are reduced to a minimum.*

9 0
WXY OPERATOR
DIAL INTERCOMMUNICATION
—permits you to select any one of eight other key telephones in the system by simply dialing one digit.
ILLUMINATED BUTTONS
—flash on incoming calls and burn steady when handset is lifted—prevents accidental interference by other users.

# KEY SYSTEM

**KELLOGG**
KELLOGG A DIVISION OF IT&T

**KELLOGG SWITCHBOARD AND SUPPLY COMPANY**
A Division of
International Telephone and Telegraph Corporation
**Sales Offices: 6650 S. Cicero Ave., Chicago 38, Ill.**
**Phone: POrtsmouth 7-6900**

**KELLOGG Branch Warehouses and Offices:**

4501 Truman Road
Kansas City 1, Missouri
HUmboldt 3-7085

23 Broderick Road
Burlingame, California
OXford 7-5780

1515 Turtle Creek Blvd.
Dallas 7, Texas
Riverside 7-5191

1555 West Fourth Street
Mansfield, Ohio
LAfayette 4-6511

1594 Southland Circle, N.W.
Atlanta, Georgia
Sycamore 4-2441

165 Prospect Street
Passaic, New Jersey
Prescott 9-3610

**New Addresses:**

5924 S. Pulaski Rd.
Chicago 29, Illinois
REliance 5-7740

6100 Excelsior Blvd.
Minneapolis 16, Minnesota
WEst 9-6715 - 16

# THE HOTTEST PABX

**9 Features You And Your Customers Will Like**

1. Exclusive keyset turret lets attendant extend incoming city trunk calls quickly by simply pressing two keyset buttons in sequence.
2. Compact, all-relay Leich Dial Switchboard fits in any modern office or plant.
3. Capacity of up to 40 telephones with 10 trunks to the main exchange and 6 local links.
4. Local links are not tied up on city trunk calls.
5. Inside, outgoing, and consultation calls are made without help from the turret attendant.
6. Standard Leich Telephones are used.
7. Tie trunks to other PABX or PBX switchboards (optional).
8. PBX trunk selection service (optional).
9. Standby power equipment for use at hospitals, etc. (optional).

**WRITE FOR THIS CATALOG TODAY!**

**LEICH**

Subsidiary of **GENERAL TELEPHONE**

# EVER DEVELOPED!

## *The* LEICH 40A PABX

*with the exclusive Keyset Turret*

LEICH

*A few times in a manufacturer's life he develops a "hot one"— a product that really catches on fast with customers. We're happy to say that's been our experience with Leich's 40A PABX. Telephone men have told their business customers about it, and found it almost sells itself.*

*Here's an example. When we introduced the Leich 40A in 1956, a few brave telephone men made one installation. (Frankly, we had to twist an arm or two to get them to try one.)*

*Being good businessmen, they tested it thoroughly. They discovered it to be a faster, more efficient, more versatile PABX. They told other PABX prospects about it, and found it extremely saleable. Our records show that most of these telephone companies who started with one installation have now installed from 10 to 25 Leich 40A PABX systems.*

*Try one Leich 40A PABX. If you do, we're sure we'll be receiving many more orders from you and your business customers. Write for the Leich 40A PABX catalog today.*

*Installation at American Chain & Cable Co., Fairfield, Iowa*

**MORE 40A PABX USERS**

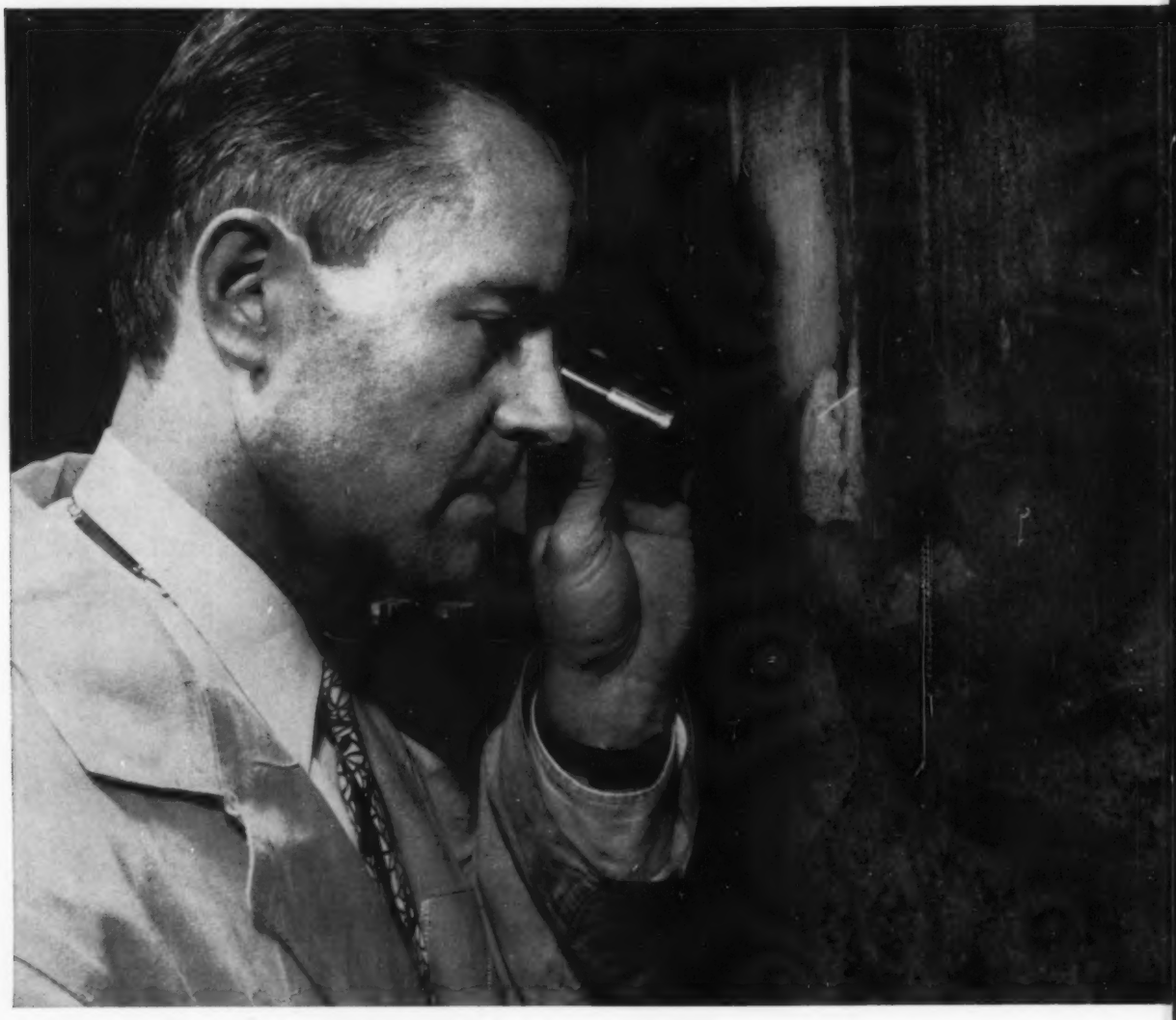
1. R. M. Towill Corporation, Honolulu, Hawaii
2. American Chain & Cable Co., Fairfield, Iowa
3. Comfo Sleep Co., Wakarusa, Indiana
4. Dixie Cup Co., Lexington, Kentucky
5. Avon Park Prison, Avon Park, Florida
6. Clinton County Bank, Wilmington, Ohio
7. Al Pierce Lumber Co., Coos Bay, Oregon
8. U. S. Army Nike Site, Redmond, Washington
9. Goodman Lumber Co., Goodman, Wisconsin
10. Superior Sterling Co., Bluefield, W. Virginia

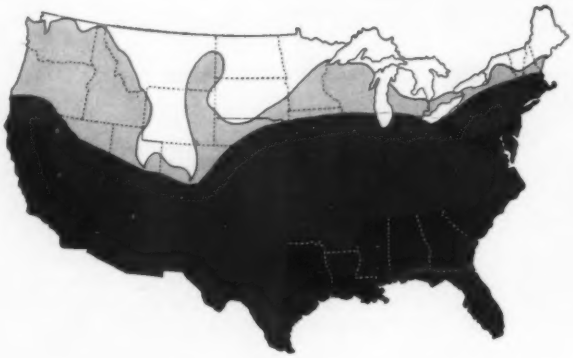
LEICH SALES CORPORATION • 427 WEST RANDOLPH STREET • CHICAGO 6, ILLINOIS

PACIFIC COAST: 11401 WEST PICO BLVD., LOS ANGELES 64, CAL.: SOUTHWEST: 1227 SLOCUM ST., DALLAS 7, TEX.: SOUTHEAST: 5126 SOUTH LOIS ST. TAMPA 11, FLA.

**manufacturers of telephones, switchboards and related apparatus since 1907**

**Termite colony** under glass at new research laboratory of United States Steel.





Solid black indicates heavy incidence of termites; dark gray, heavy to moderate; and light gray, slight to moderate.

# We have termites so you won't

**Termites eat untreated wood**—are repelled by pressure-creosoted wood.

**There's a colony of termites** working for United States Steel in our new research laboratory. One of our scientists located them in an old stump near one of our test plots in Mississippi. Now their habits are being studied to find out what makes creosote such an effective protection against these destructive insects.

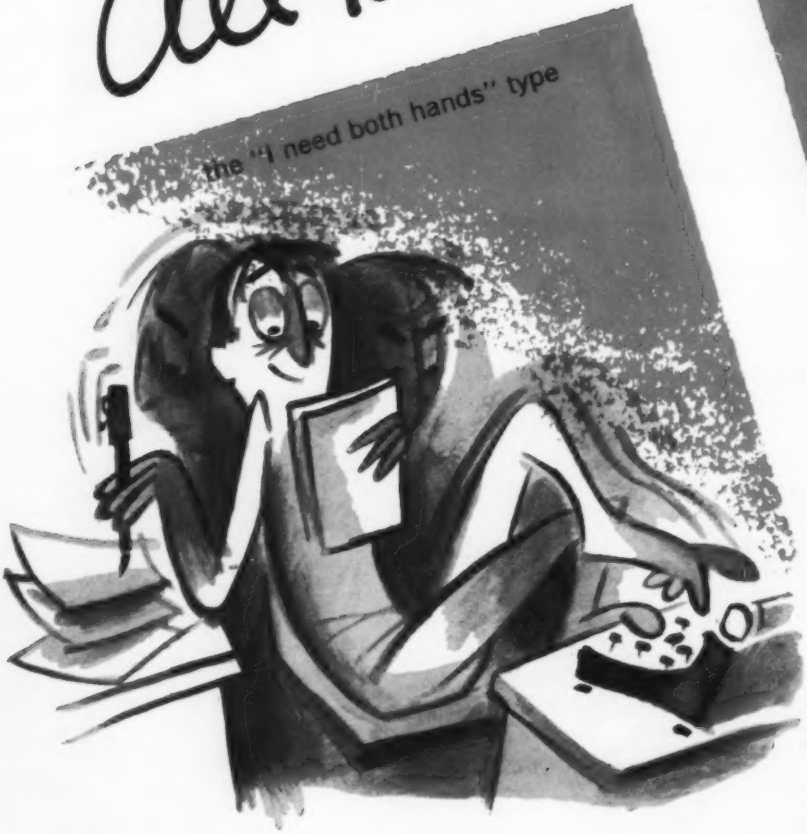
Termites are found in every state in the union, with heavy infestations as far north as Wisconsin and Massachusetts (see map). They eat and digest ordinary untreated wood and soon attack wood that has been merely dipped or coated. But the deep penetration of pressure-creosoting offers lasting protection against termites and other wood destroying organisms. Pressure-creosoted poles and timbers have averaged 35 years of life in many localities.

Pressure-creosoting should be looked upon as low-cost insurance. Its advantages and economies are thoroughly proved. For more information on pressure treatment and USS Creosote—the quality preservative—write United States Steel, 525 William Penn Place, Pittsburgh 30, Pa., or call the nearest United States Steel Chemical Sales Office.

**Sales Offices in Pittsburgh, New York, Chicago, Salt Lake City and Fairfield, Alabama**

USS **Creosote**

# All kinds of folks need



# loud-speaking telephones!

Automatic's Loud-Speaking Telephone can be put at a centralized point in a conference group and still not cause feedback, because the microphone is in the base of the telephone. The Type 88 doesn't waste working space either—it's the same size as a regular telephone.

It's surprising how *really* convenient telephoning can be with Automatic's Type 88 Loud-Speaking Telephone. And it's wonderful, too, how many people will say: *"I want one"!* With it, a man can talk and keep both hands free; he can move about and do other work while talking. His voice is picked up from several feet away, by a microphone in the base of the telephone—and he hears the other party over a speaker.

*The Type 88 works simply.* To answer, you merely press a button; when finished, you need only press another. It has proven invaluable as a conference telephone because many persons can enter into the same conversation.

Subscribers are naturally happier, more productive, with Automatic's Loud-Speaking Telephone. And telephone companies are gaining substantial added revenue. If you'd like to learn more about this profit-making telephone, write for Circular 1857. Address: *Automatic Electric Sales Corporation, Northlake, Illinois. Or call FIllmore* 5-7111.

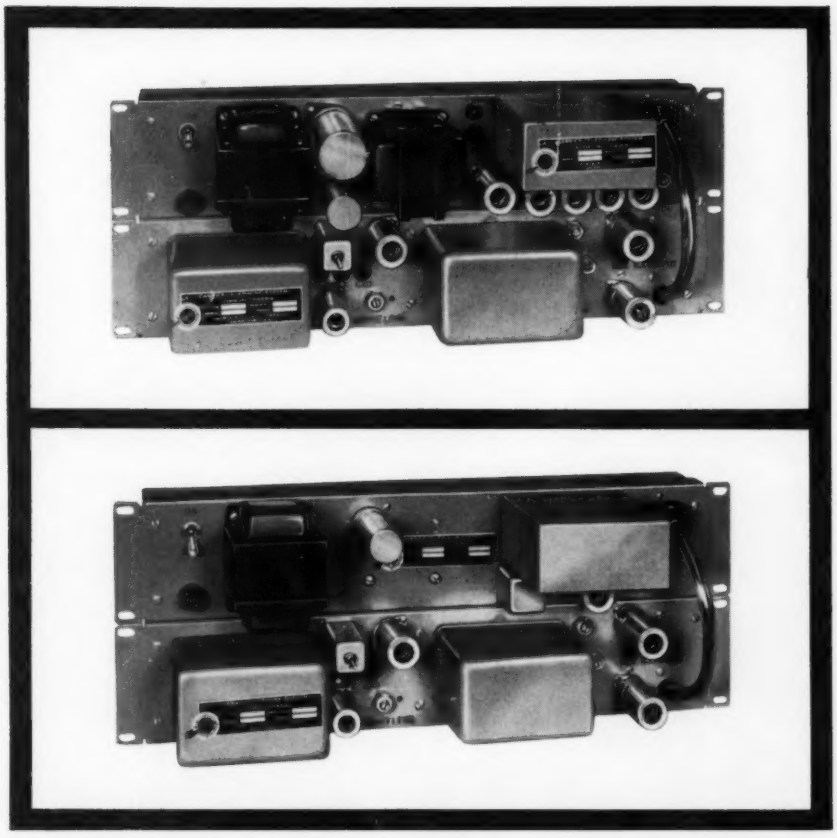
**AUTOMATIC ELECTRIC**

A member of the General Telephone System—One of America's great communications systems

GENERAL SYSTEM

# NOW on 30 day delivery...

## North low-cost divided



Available in Canada through ERICSSON TELEPHONE SALES of CANADA, Ltd. Montreal 8, P.Q.

# ringing carrier...

10 party full selective ringing using decimonic, harmonic, or synchromonic ringing frequencies

low cost, high quality, minimum maintenance, simple line up

With the use of 5 channels of North Divided Ringing Carrier you can serve 60 telephones over 1 physical pair, with each phone ringing independently.

Added revenue can be yours immediately without the tremendous expense of physical line construction.

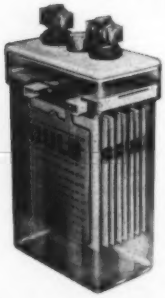
Available in Channels 1, 2, 3, 4 and 5 on 30-day delivery from

**NORTH ELECTRIC COMPANY**

**601 SOUTH MARKET STREET • GALION, OHIO**

# Why worry about Batteries...

## *Specify* **gould** and relax



America's Finest!
GOULD PLANTÉ
The Aristocrat of
Stationary Batteries

*Dependable* battery performance day in, day out is worth more to you than any other single benefit. Right? That's why Gould has carefully perfected the design of Gould Batteries over long test years. Manufacturing techniques at Gould are also the result of patient development, so that today you are assured of maximum power, long life, and trouble-free operation with *every* Gould battery you buy. Ask for new booklet "...so you're going to buy an industrial battery." Write Gould-National Batteries, Inc., Trenton 7, N.J.

©1957 Gould-National Batteries, Inc.

Always Use Gould-National Automobile and Truck Batteries *More Power to you from Gould*

# IN THE NATION'S CAPITAL

BY FRANCIS X. WELCH, WASHINGTON EDITOR

**Testimony in House probe of commissions indicates congressmen, themselves, have "approached" commissioners on cases before them. . . . Suggests faith can be restored in the regulatory process by having commissioners "put their judicial robes back on" and be independent of outside pressure.**

DURING the past week, here in Washington, D. C., the special House committee investigating the federal regulatory commissions continued to turn up a sorry picture of how regulation should not be practiced. For the first time since this House group was launched on its program of disclosing all forms of unfair or improper pressure which it could discover, in connection with the operations of the FCC, the spotlight was finally turned on the congressmen themselves.

During the early stage of the investigation the stream of accusations was pretty carefully selected so as to be aimed in one direction—at the administration and its political supporters. Before he was fired by the sub-committee for defiance of its orders, former counsel Dr. Bernard Schwartz leveled a series of serious charges, or at least serious implications, connecting cabinet officers, White House advisers, and even an in-law of the President himself. Nothing much has come of this by way of conclusive proof. But, in the parade of witnesses, including an unsuccessful applicant for a television station in Miami, the names of four U. S. Senators have been mentioned.

This puts the shoe on the other foot, to some extent. But, it does not make the over-all picture any prettier, as far as public confidence in our regulatory system is concerned. Some of these senators have admitted "contacting" members of the FCC, although all expressed the pious wish only that the case discussed should be decided on its merits. Just how a case could be decided on its merits when commissioners are expected to pay attention to every telephone call or visitor from either Capitol Hill or from administration sources is a puzzling question. This situation is also downright shocking to those who think in terms of judicial process.

Such was the reaction of one member of the House sub-committee, Rep. Charles A. Wolverton (R., N. J.) who expressed indignation at the disclosure of widespread political pressure being put on the FCC. Wolverton said that such use of outside pressure is "so strikingly wrong that it shocks me and I am sure it shocks anyone else with any knowledge of morality." This outburst was after one of the witnesses—Col. A. Frank Katzentine, owner of a Miami radio station and the unsuccessful applicant for Miami's television Channel 10—testified about 15 persons contacting the FCC members on behalf of his application.

Wolverton remarked "I do not think you would approach a judge in such a backstage, surreptitious manner."

Colonel Katzentine did not answer directly, but implied that he had to use such a backdoor approach in self-defense because the "other side"—that is to say the successful applicant—was using the same tactics to influence FCC votes through pressure methods. Therefore, Colonel Katzentine figured, he had a right to seek help from powerful friends. Then Wolverton read into the record a letter to the FCC from a National Democratic Committeeman from Florida, praising Colonel Katzentine "as a loyal Democrat all his life . . . entitled to all the considerations that a good citizen and a good Democrat is entitled to." Obviously, this was an out and out political approach to impress, if not influence, a regulatory decision by the FCC. "Whether we take another minute of testimony," Representative Wolverton said, "it has been made abundantly clear to me that something must be done to correct a situation in which an agency with judiciary powers could be approached on political lines."

There is no point in pursuing further, in this department, details of the unsavory testimony along this line. Ugly words such as "blackmail" and "payoff" and comments to the effect a commissioner was "pledged" or "unpledged" to vote on a case before him, were bandied about. Not many at the hearings seemed to be as shocked as Wolverton about all this—probably because it has been going on for so many years.

This is not a new situation, by any means, nor one that can be laid on the doorstep of any particular administration or Congress. It has been an unwholesome condition which has been going on, more or less, from the very time the FCC was set up in business in 1934. This writer can recall a comment made over 20 years ago, by one of the original members of the FCC—the late George Henry Payne. He complained that he could hardly open his door to leave his office in the FCC without "stumbling over three or four lobbyists."

### *Quasi-judicial Rule*

In the pushing and shoving of outside pressures, the FCC seems to be far more sinned against than sinning.

This observer suggests that the real basis of the difficulty may still be pretty generally overlooked, not only by this investigating sub-committee, but by a great many critics of commission regulation. What is being overlooked—if indeed it is even recognized by many—is the *quasi-judicial character of the regulatory commissions.*

They were originally established to operate as independent boards, deciding cases strictly on the facts in the record before them. As Representative Wolverton has pointed out, anyone, whether lawyer or layman, who would dare to contact a decent judge, with the view of influencing a case before that judge for decision, would be quickly and properly rebuked. There is a thoughtful story told about the late Chief Justice Harold M. Stephens of the District of Columbia Circuit Court of Appeals. It seems that some foolish people once tried to bring some pressure on him in connection with the conviction of a prominent political figure who had gotten into trouble. He received letters from political leaders, from businessmen, from labor leaders, from government officials, and even from clergymen who were friends of the accused. The gist of these letters was to the effect that the defendant was really a good fellow at heart, who had always been loyal to his friends, to his party, family, church, etc. Judge Stephens charitably overlooked the impropriety of such efforts to influence his judgment by pointing out that he really could not do anything for these people.

Why? Because his "boss" required him to confine his attention entirely to the record properly made in the case before him in open court. When somebody asked him who his "boss" was Judge Stephens is reported to have said: "I just work for a blind lady. You can see her statue out there in front of the court house. She has a pair of scales in her hands."

Giving the regulatory commissioners protection against pressure of all kinds is, after all, in the interest of the parties to a regulatory proceeding, themselves. In the Miami television case, for example, it has been pointed out that the mere filing of an application for a television license was a very expensive gamble, with the odds of success no better than backing a new play on Broadway.

As a first step, very broad and costly engineering surveys have to be made. The applicant has to buy a site for his station, get an architect to draw up plans for suitable building and plant facilities. Program advisers must be hired to draw up an agenda to show the kind of service the applicant is prepared to render if he is successful. He must also show that he has enough money and general reputable standing in order to be eligible and qualified to operate successfully. All this proof must be assembled, with many exhibits, before the FCC will even consent to consider the application. And, all the while, of course, there are very considerable legal fees for lawyers in Washington, as well as in the service area. Once the application is under way there must also be a good bit of traveling to Washington and a good bit of time spent there at hearings. Altogether, an applicant for a television license might honestly and earnestly spend a million dollars before knowing whether he is going to get a license or not.

It stands to reason that anybody called upon to take such a financial risk should go into the matter with the expectation of playing fairly by the rules and abiding by the result. He is also entitled to anticipate that all the costly information he has assembled will be considered on its merits by the FCC, along with similar information fairly placed in the record by rival applicants. Finally, he is entitled to expect that the FCC will consider *the record, the entire record, and nothing else but the record.* If, in spite of that, the case is ultimately decided on the basis of some big political brass or cheap, bold "fixers" darting in and out the back doors of commission offices, he has a right to feel that he has been duped and defrauded.

### *The Day Commissioners Took Off Their Robes*

One of the difficulties of the regulatory commissioners—both federal and state—in maintaining any semblance of judicial impartiality has been the movement, over the years, to popularize the commissioners. This started at least 30 years ago in many places. The idea behind this movement was that the regulatory commissions were *not* courts, and that the commissioners were *not* judges. They were supposed to look after the rights of "the people." It was back in 1930, as this writer recalls, that the late President Franklin D. Roosevelt, then governor of New York, vetoed a bill passed by the New York Legislature to set up the office of "People's Counsel." The purpose of that bill was to establish a sort of specialized regulatory district attorney, to represent utility consumers before the New York Public Service Commission. In his veto message, Governor Roosevelt said that the bill would establish an unnecessary function, because protection of the consumer was a duty which the commission ought to perform itself, on behalf of the public interest.

In other words, it was Roosevelt's honest and sincere view—and he apparently continued in that belief to the day of his death—that regulatory commissions should not sit in the manner of judicial tribunals, impartially weighing evidence placed before them. Many other governors, politicians, professors, lawmakers, etc., have since shared that view. They felt that the regulatory commissioners should aggressively represent "the people" because that was in the "public interest." Several years after that Roosevelt, as President of the United States, similarly junked the office of "People's Counsel" before the Public Utilities Commission of the District of Columbia. He told the commissioners, in effect, to take off their judicial robes, get down off the bench and go to work to protect "the people."

But, there was another view which prevailed at Albany in 1930. It was held by a very distinguished chairman of the New York Public Service Commission, the late William A. Prendergast. Prendergast felt so strongly that the regulatory commissions should be conducted on a judicial plane, administering fair and impartial justice on the basis of records properly made before them, that he resigned rather than continue in office, under the views held by the governor of New York at that time.

That was the day, figuratively speaking, when the commissioners took off their robes. They were no longer regulatory judges. They were supposed to be buddies or pals of "the people." They were supposed to follow the public interest where they found it, and the temptation was inevitably strong to find it on the popular side.

It should be said, in fairness, that not too many commissions or individual commissioners followed this course. Many commissions, even in New York State for example, have found that they could preserve some semblance of a quasi-judicial status by relegating the aggressive espousal of advocacy for consumers to the commission staff. That is in the nature of a compromise, but it has been a fairly workable compromise in many states. The same arrangements have been worked out by some federal commissions.

But, fundamentally, the mischief was done the day the commissioners took off their robes—or had them torn off by the politicians. No longer could the commissioners feel free to withdraw to the dignified insulation of judicial chambers, in considering cases before them. Many felt they had the duty at least to keep their doors open con-

stantly. This meant listening to every Tom, Dick and Harry who might wander in off the street with something to say about a case pending before the commission. Few commissioners ever took offense at the practice, even though they found it personally distasteful. *Nobody has ever been punished for contempt of a regulatory commission's dignity by presuming to address a commission "in chambers."!* Bar associations frown on the practice. Reputable lawyers fight shy of it. But, it is still done.

There have been instances of regulatory commissioners going to the other extreme. There have been cases (in states where commissioners are elected rather than appointed) where individuals have campaigned for office with virtual promises of rate reductions, if elected. These cases have been few, but the picture is nevertheless an ugly one. What would we say if a judge ran for office on a campaign promise that, if elected, he would not ever send anybody to jail?

There was one case, several years ago, of a state commissioner who virtually shook his fist in defiance at his own state supreme court, because his commission had been reversed in a rate case appeal. It so happened the commissioner was running for another public office at the time. (He didn't make it.) What is the difference, morally, between a regulatory official accepting a monetary favor from regulated parties, and one who demogogically appeals for public support at the polls at the expense of justice for an unpopular cause?

This writer has recently heard of a state commissioner who figuratively followed a telephone company out of his own hearing room with public speeches calculated to injure that company's business and public relations. Angered because the company had persisted in court appeals and in taking its own case directly to the public with paid publicity, this commissioner invited and encouraged other telephone companies to compete with or replace, the service of the litigating company. He charged the latter with a "sit down" strike against public interest and pointed to cheap REA loans (at 2 per cent) as a chance for others to take over parts of its service area. What would we think of a judge who did that?

### *Restoring Faith in Regulation*

With this whole background of official toleration, if not encouragement, of outside pressure on regulatory commissioners, we cannot expect a permanent cure by the old expedient of firing some imprudent commissioners or reorganizing some commissions or their staffs. That method has been tried before and it has not worked. Many a just and honest man has come to Washington to serve on a federal commission only to find the general expectation that it was his duty to see and listen to visitors from Capitol Hill or the administrative branch. In such a general climate of irregularity, a novice might reasonably be expected to conform outwardly with the conventions of the system that has grown up. After all, he could rationalize, a commissioner should be close to the people; and these (officials, congressmen, etc.) are some mighty fine people. Furthermore, he might say to himself, I only have to listen politely. I don't have to be influenced by what they say. I can still decide the case on its merits.

A permanent cure, which probably will not be taken as long as both Congress and the administration insist on keeping their fingers in regulatory pies, would be to make the commissioners put their judicial robes back on. This could be done by carrying out the spirit as well as the letter of the U. S. Supreme Court decision in the celebrated Humphries case, a quarter of a century ago. In that decision the highest court said that the regulatory commissions (the case decided happened to involve a member of the Federal Trade Commission, whom the President of the United States tried to fire, because of a disagreement over political policy) must be independent. The court said this independence must be guarded jealously by giving to the commission its security and protection of their tenure in office. This meant that even the President should not have the power to dismiss a regulatory commissioner, just because he was displeased with his decisions.

We have come a long way from the Humphries case; and the regulatory process has not been helped by the manner in which it has been subjected to pressures from any source—popular, political, administrative, legislative, or selfish financial interests. The remedy is clear enough. To restore general confidence in our regulatory commissions and their reputation for fair and impartial judgment, we must return to the Spirit of the Humphries case.

Giving our commissioners longer terms, better pay, better staffs, and more secure tenure of office is one obvious step. How can we expect them to behave like judges, unless we treat them like judges and give them similar protection in their functions? With such safeguards, we can expect and require that these commissions will work out their own rules of ethical procedures that would outlaw once and for all the possibility or suspicion of outside pressure, political favoritism, or backdoor advocacy. They should have the same powers as a court to cite and punish for contempt any one who would presume to trifle with regulatory justice.

In other words, we must find the way to put our commissioners back into their judicial robes.

This is not to suggest that there is any real basis for doubting the effectiveness or soundness of commission regulation as an institution. On the contrary, the real danger of all this unpleasant testimony in Washington is that the public may be misled or confused as to how truly successful commission regulation has been and how well it has served the people. There is really no other way in which public interest can be well served, nor by which our private enterprise system in the utility business could survive. The only alternative would be public ownership or socialism which would quickly put an end to both true public utility service and the enterprise system under which it has been so successfully created and carried out in this country.

Probably the average American utility customer does not realize to what extent regulatory commissions, with watchful guidance and with the cooperation of the utility companies, have protected his interests, and have done so for more than fifty years. Regulation also protects utility employes by aiming to stabilize utility companies, so that they may have a sounder foundation for the support of a constantly expanding business. This naturally means more steady and secure employment, with more and better paying job opportunities for everybody on the payroll.

By the same token, regulation has benefited the manufacturers of utility equipment, for the utilities, with sounder credit and healthy growth, providing a larger and expanding market for all types of machinery, supplies, and accessories. This market is being created and maintained by sound regulation. Public service regulation is a superior American plan of substitution for state ownership which has largely swallowed up most of the public utilities in European and foreign countries. American utilities are able to stand on their own feet—dealing fairly with employes, consumers, manufacturers, and investors alike—because they have been made strong by a just system of public service regulation. We must find a way to keep it that way, with dignity and fairness to all.

This observer suggests that the real basis of the difficulty may still be pretty generally overlooked, not only by this investigating sub-committee, but by a great many critics of commission regulation. What is being overlooked—if indeed it is even recognized by many—is the *quasi-judicial character of the regulatory commissions.*

They were originally established to operate as independent boards, deciding cases strictly on the facts in the record before them. As Representative Wolverton has pointed out, anyone, whether lawyer or layman, who would dare to contact a decent judge, with the view of influencing a case before that judge for decision, would be quickly and properly rebuked. There is a thoughtful story told about the late Chief Justice Harold M. Stephens of the District of Columbia Circuit Court of Appeals. It seems that some foolish people once tried to bring some pressure on him in connection with the conviction of a prominent political figure who had gotten into trouble. He received letters from political leaders, from businessmen, from labor leaders, from government officials, and even from clergymen who were friends of the accused. The gist of these letters was to the effect that the defendant was really a good fellow at heart, who had always been loyal to his friends, to his party, family, church, etc. Judge Stephens charitably overlooked the impropriety of such efforts to influence his judgment by pointing out that he really could not do anything for these people.

Why? Because his "boss" required him to confine his attention entirely to the record properly made in the case before him in open court. When somebody asked him who his "boss" was Judge Stephens is reported to have said: "I just work for a blind lady. You can see her statue out there in front of the court house. She has a pair of scales in her hands."

Giving the regulatory commissioners protection against pressure of all kinds is, after all, in the interest of the parties to a regulatory proceeding, themselves. In the Miami television case, for example, it has been pointed out that the mere filing of an application for a television license was a very expensive gamble, with the odds of success no better than backing a new play on Broadway.

As a first step, very broad and costly engineering surveys have to be made. The applicant has to buy a site for his station, get an architect to draw up plans for suitable building and plant facilities. Program advisers must be hired to draw up an agenda to show the kind of service the applicant is prepared to render if he is successful. He must also show that he has enough money and general reputable standing in order to be eligible and qualified to operate successfully. All this proof must be assembled, with many exhibits, before the FCC will even consent to consider the application. And, all the while, of course, there are very considerable legal fees for lawyers in Washington, as well as in the service area. Once the application is under way there must also be a good bit of traveling to Washington and a good bit of time spent there at hearings. Altogether, an applicant for a television license might honestly and earnestly spend a million dollars before knowing whether he is going to get a license or not.

It stands to reason that anybody called upon to take such a financial risk should go into the matter with the expectation of playing fairly by the rules and abiding by the result. He is also entitled to anticipate that all the costly information he has assembled will be considered on its merits by the FCC, along with similar information fairly placed in the record by rival applicants. Finally, he is entitled to expect that the FCC will consider *the record, the entire record, and nothing else but the record.* If, in spite of that, the case is ultimately decided on the basis of some big political brass or cheap, bold "fixers" darting in and out the back doors of commission offices, he has a right to feel that he has been duped and defrauded.

### *The Day Commissioners Took Off Their Robes*

One of the difficulties of the regulatory commissioners—both federal and state—in maintaining any semblance of judicial impartiality has been the movement, over the years, to popularize the commissioners. This started at least 30 years ago in many places. The idea behind this movement was that the regulatory commissions were *not* courts, and that the commissioners were *not* judges. They were supposed to look after the rights of "the people." It was back in 1930, as this writer recalls, that the late President Franklin D. Roosevelt, then governor of New York, vetoed a bill passed by the New York Legislature to set up the office of "People's Counsel." The purpose of that bill was to establish a sort of specialized regulatory district attorney, to represent utility consumers before the New York Public Service Commission. In his veto message, Governor Roosevelt said that the bill would establish an unnecessary function, because protection of the consumer was a duty which the commission ought to perform itself, on behalf of the public interest.

In other words, it was Roosevelt's honest and sincere view—and he apparently continued in that belief to the day of his death—that regulatory commissions should not sit in the manner of judicial tribunals, impartially weighing evidence placed before them. Many other governors, politicians, professors, lawmakers, etc., have since shared that view. They felt that the regulatory commissioners should aggressively represent "the people" because that was in the "public interest." Several years after that Roosevelt, as President of the United States, similarly junked the office of "People's Counsel" before the Public Utilities Commission of the District of Columbia. He told the commissioners, in effect, to take off their judicial robes, get down off the bench and go to work to protect "the people."

But, there was another view which prevailed at Albany in 1930. It was held by a very distinguished chairman of the New York Public Service Commission, the late William A. Prendergast. Prendergast felt so strongly that the regulatory commissions should be conducted on a judicial plane, administering fair and impartial justice on the basis of records properly made before them, that he resigned rather than continue in office, under the views held by the governor of New York at that time.

That was the day, figuratively speaking, when the commissioners took off their robes. They were no longer regulatory judges. They were supposed to be buddies or pals of "the people." They were supposed to follow the public interest where they found it, and the temptation was inevitably strong to find it on the popular side.

It should be said, in fairness, that not too many commissions or individual commissioners followed this course. Many commissions, even in New York State for example, have found that they could preserve some semblance of a quasi-judicial status by relegating the aggressive espousal of advocacy for consumers to the commission staff. That is in the nature of a compromise, but it has been a fairly workable compromise in many states. The same arrangements have been worked out by some federal commissions.

But, fundamentally, the mischief was done the day the commissioners took off their robes—or had them torn off by the politicians. No longer could the commissioners feel free to withdraw to the dignified insulation of judicial chambers, in considering cases before them. Many felt they had the duty at least to keep their doors open con-

stantly. This meant listening to every Tom, Dick and Harry who might wander in off the street with something to say about a case pending before the commission. Few commissioners ever took offense at the practice, even though they found it personally distasteful. *Nobody has ever been punished for contempt of a regulatory commission's dignity by presuming to address a commission "in chambers."!* Bar associations frown on the practice. Reputable lawyers fight shy of it. But, it is still done.

There have been instances of regulatory commissioners going to the other extreme. There have been cases (in states where commissioners are elected rather than appointed) where individuals have campaigned for office with virtual promises of rate reductions, if elected. These cases have been few, but the picture is nevertheless an ugly one. What would we say if a judge ran for office on a campaign promise that, if elected, he would not ever send anybody to jail?

There was one case, several years ago, of a state commissioner who virtually shook his fist in defiance at his own state supreme court, because his commission had been reversed in a rate case appeal. It so happened the commissioner was running for another public office at the time. (He didn't make it.) What is the difference, morally, between a regulatory official accepting a monetary favor from regulated parties, and one who demogogically appeals for public support at the polls at the expense of justice for an unpopular cause?

This writer has recently heard of a state commissioner who figuratively followed a telephone company out of his own hearing room with public speeches calculated to injure that company's business and public relations. Angered because the company had persisted in court appeals and in taking its own case directly to the public with paid publicity, this commissioner invited and encouraged other telephone companies to compete with or replace, the service of the litigating company. He charged the latter with a "sit down" strike against public interest and pointed to cheap REA loans (at 2 per cent) as a chance for others to take over parts of its service area. What would we think of a judge who did that?

### *Restoring Faith in Regulation*

With this whole background of official toleration, if not encouragement, of outside pressure on regulatory commissioners, we cannot expect a permanent cure by the old expedient of firing some imprudent commissioners or reorganizing some commissions or their staffs. That method has been tried before and it has not worked. Many a just and honest man has come to Washington to serve on a federal commission only to find the general expectation that it was his duty to see and listen to visitors from Capitol Hill or the administrative branch. In such a general climate of irregularity, a novice might reasonably be expected to conform outwardly with the conventions of the system that has grown up. After all, he could rationalize, a commissioner should be close to the people; and these (officials, congressmen, etc.) are some mighty fine people. Furthermore, he might say to himself, I only have to listen politely. I don't have to be influenced by what they say. I can still decide the case on its merits.

A permanent cure, which probably will not be taken as long as both Congress and the administration insist on keeping their fingers in regulatory pies, would be to make the commissioners put their judicial robes back on. This could be done by carrying out the spirit as well as the letter of the U. S. Supreme Court decision in the celebrated Humphries case, a quarter of a century ago. In that decision the highest court said that the regulatory commissions (the case decided happened to involve a member of the Federal Trade Commission, whom the President of the United States tried to fire, because of a disagreement over political policy) must be independent. The court said this independence must be guarded jealously by giving to the commission its security and protection of their tenure in office. This meant that even the President should not have the power to dismiss a regulatory commissioner, just because he was displeased with his decisions.

We have come a long way from the Humphries case; and the regulatory process has not been helped by the manner in which it has been subjected to pressures from any source—popular, political, administrative, legislative, or selfish financial interests. The remedy is clear enough. To restore general confidence in our regulatory commissions and their reputation for fair and impartial judgment, we must return to the Spirit of the Humphries case.

Giving our commissioners longer terms, better pay, better staffs, and more secure tenure of office is one obvious step. How can we expect them to behave like judges, unless we treat them like judges and give them similar protection in their functions? With such safeguards, we can expect and require that these commissions will work out their own rules of ethical procedures that would outlaw once and for all the possibility or suspicion of outside pressure, political favoritism, or backdoor advocacy. They should have the same powers as a court to cite and punish for contempt any one who would presume to trifle with regulatory justice.

In other words, we must find the way to put our commissioners back into their judicial robes.

This is not to suggest that there is any real basis for doubting the effectiveness or soundness of commission regulation as an institution. On the contrary, the real danger of all this unpleasant testimony in Washington is that the public may be misled or confused as to how truly successful commission regulation has been and how well it has served the people. There is really no other way in which public interest can be well served, nor by which our private enterprise system in the utility business could survive. The only alternative would be public ownership or socialism which would quickly put an end to both true public utility service and the enterprise system under which it has been so successfully created and carried out in this country.

Probably the average American utility customer does not realize to what extent regulatory commissions, with watchful guidance and with the cooperation of the utility companies, have protected his interests, and have done so for more than fifty years. Regulation also protects utility employes by aiming to stabilize utility companies, so that they may have a sounder foundation for the support of a constantly expanding business. This naturally means more steady and secure employment, with more and better paying job opportunities for everybody on the payroll.

By the same token, regulation has benefited the manufacturers of utility equipment, for the utilities, with sounder credit and healthy growth, providing a larger and expanding market for all types of machinery, supplies, and accessories. This market is being created and maintained by sound regulation. Public service regulation is a superior American plan of substitution for state ownership which has largely swallowed up most of the public utilities in European and foreign countries. American utilities are able to stand on their own feet—dealing fairly with employes, consumers, manufacturers, and investors alike—because they have been made strong by a just system of public service regulation. We must find a way to keep it that way, with dignity and fairness to all.

# Business Needs Basic Research

***Wave guide and Dataphone service are two developments the Bell System attributes to basic research. New urgency for basic research now present in the face of stepped-up competition the free world is confronted with in the areas of science and new knowledge.***

***By Frederick R. Kappel****

I'LL BEGIN by showing you two or three things and then I want to talk about something else.

This may seem like a double-jointed way to give a talk but I promise you it isn't as irrational as it sounds.

First, here is a short length of what in the telephone business we call a wave guide.

It does just what its name implies. In radio relay systems, which carry thousands of telephone conversations and also TV programs, this kind of structure guides radio waves in and out of the amplifying equipment at each relay tower. Some day, we are confident, new forms of long distance wave guides will carry hundreds of thousands of conversations, and hundreds of TV pictures, across the country under ground.

Here is another piece of hardware. This is part of what we call a "pulse code modulation terminal." But never mind the name. This is new transistorized equipment. It takes samples of voice currents in pulses of millionths of a second. Many sets of these samples, each with its own code, can travel over a telephone line only millionths of a second apart. So for all practical purposes they go over the same wires at the same time.

This system is so efficient, we are sure we can use it to multiply talking paths over many short routes more cheaply than by installing more cables. Thus we can begin to do *within* local telephone exchanges what we have been doing on long distance lines for many years.

*Mr. Kappel, president of American Telephone and Telegraph Co., presented this talk before The Economic Club of New York.

Now I'm going to ask you to listen to something for a moment. It is a tape recording of a test of an entirely new kind of telephone call. This call, like most others, starts with the sounds of dialing.

(A short recording of a test of dataphone service was played.)

### *Sending Data by Telephone*

You have just heard one clerk call another and transmit data over a regular telephone circuit. This is dataphone service and dataphone means just what it sounds like—sending data by telephone.

A dataphone instrument is associated with a telephone. You make a call in the usual way—local or long distance—through the regular telephone network. Then you push a button. The dataphone instrument accepts electrical impulses from different kinds of data-producing machines, and sends them over an ordinary telephone connection. At the far end the tones you heard are converted back to impulses which reproduce the data. When your business is done, you simply hang up the telephone.

Now back to the call you heard. It had only 20 seconds of data transmission so as not to bore you, but the information sent in that 20 seconds is equivalent to the inventory position of 150 items in a supermarket. To say it another way, the supermarket's entire inventory of some 7,000 items could be sent in 16 minutes. The entire inventory listed this way would be 194 feet long.

Dataphone service is brand-new. But we think it has tremendous possibilities for usefulness.

### *Need for Basic Research*

As I said at the start, however, these things I've been showing you are not what I'm here to talk about. My subject is rather the fundamental, underlying effort which makes all such progress possible. This is the search for new knowledge—the effort to increase our understanding of nature—the probing into the unknown that we call basic research.

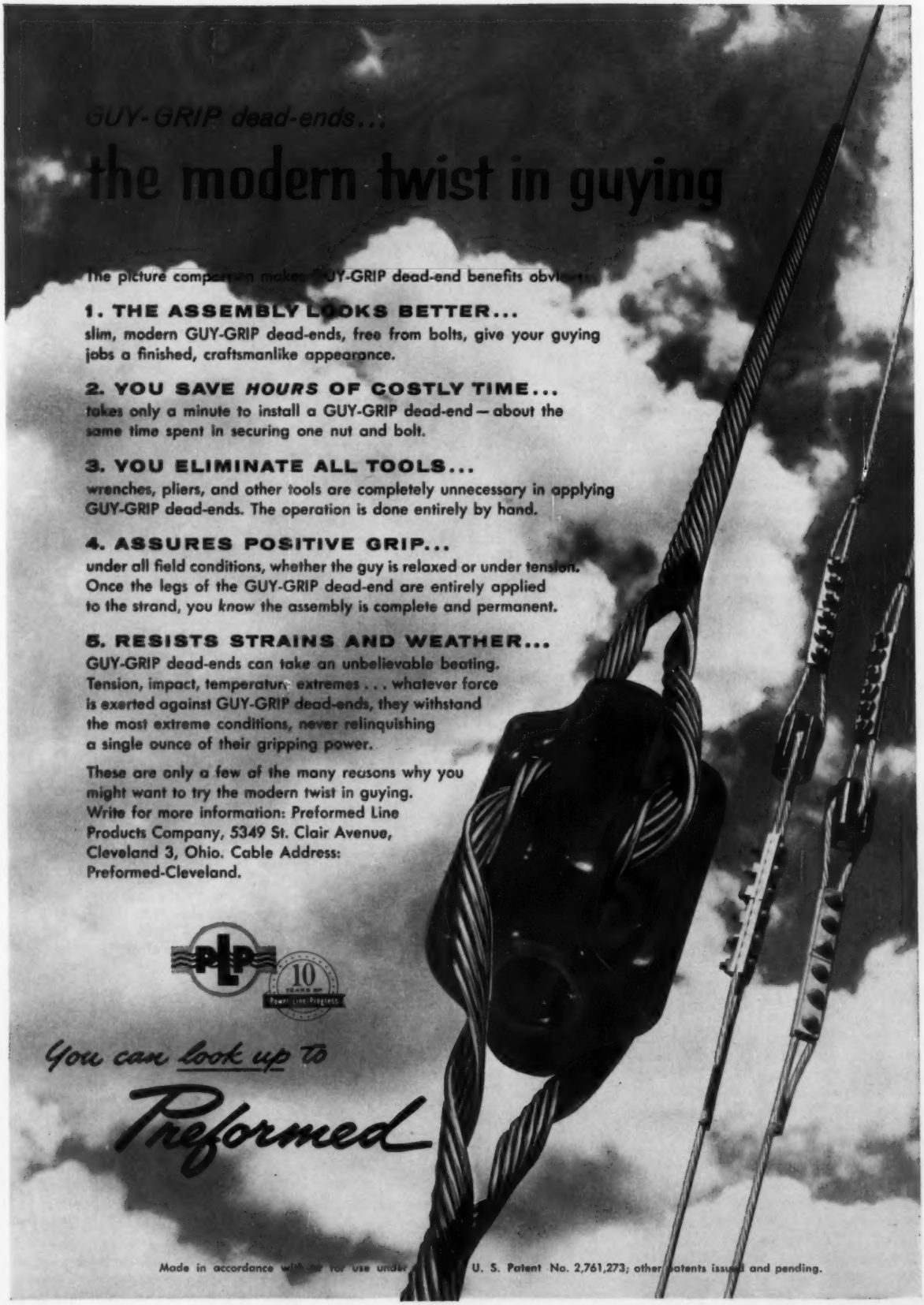
If it were not for basic research, none of these things I have shown would exist. The services we provide would have nothing like their present and potential usefulness. For that matter there would be no telephone system comparable to what we know. These examples merely illustrate that general point.

The wave guide of today was born of mathematical thinking that started 30 years ago, and the wave guides of tomorrow are being born of new equations that men are laboring with right now. The process of sending information by pulsing and coding grows out of entirely new fundamental theory as to what communication really is. Dataphone service is only possible because of the reliability which new knowledge, step-by-step, has built into the telephone network.

So we in the Bell System are deeply committed to basic research. This has been essential not only to provide universal service, but to cope with inflation, reduce the effects of rising costs, and increase our markets in competition with other industry.

### *New Kind of Competition*

Now perhaps in the past we telephone people have had more need for


GUY-GRIP dead-ends...
the modern twist in guying
The picture comparison makes GUY-GRIP dead-end benefits obvious:
1. THE ASSEMBLY LOOKS BETTER...
slim, modern GUY-GRIP dead-ends, free from bolts, give your guying jobs a finished, craftsmanlike appearance.
2. YOU SAVE HOURS OF COSTLY TIME...
takes only a minute to install a GUY-GRIP dead-end — about the same time spent in securing one nut and bolt.
3. YOU ELIMINATE ALL TOOLS...
wrenches, pliers, and other tools are completely unnecessary in applying GUY-GRIP dead-ends. The operation is done entirely by hand.
4. ASSURES POSITIVE GRIP...
under all field conditions, whether the guy is relaxed or under tension. Once the legs of the GUY-GRIP dead-end are entirely applied to the strand, you know the assembly is complete and permanent.
5. RESISTS STRAINS AND WEATHER...
GUY-GRIP dead-ends can take an unbelievable beating. Tension, impact, temperature extremes . . . whatever force is exerted against GUY-GRIP dead-ends, they withstand the most extreme conditions, never relinquishing a single ounce of their gripping power.
These are only a few of the many reasons why you might want to try the modern twist in guying. Write for more information: Preformed Line Products Company, 5349 St. Clair Avenue, Cleveland 3, Ohio. Cable Address: Preformed-Cleveland.
PLP
10
You can look up to
Preformed
Made in accordance with or for use under U. S. Patent No. 2,761,273; other patents issued and pending.

research than others. However I question if this is any longer true.

One reason why I question it is that today all industry in the free world faces a new kind of competition. Soviet science is moving with tremendous mass and terrific momentum. It has stepped out into space ahead of us and it would be sheer folly not to recognize its driving will to step ahead in every other way.

This is not just a matter of missiles and satellites. It is much, much more. It is a matter of markets—of leadership in trade and commerce—of the power of free industry to strengthen the public welfare and to win and keep worldwide esteem.

In the past, American industry has led the world largely because we have used existing knowledge with great ingenuity, developed new products, and introduced all kinds of innovations in organizing people and machines.

But now, as I have said, we face the new and mighty competition of science and new knowledge in the hands of determined men who have flatly told us they mean to rule the world.

Can competition on this plane be successfully countered by purely industrial and productive skills alone? Not in my judgment—no more than the competition of the telephone could be met by the most artful ingenuity in the development, design and mass production of megaphones; no more than the internal combustion engine could be matched by giving the horse an extra quart of oats and putting ball bearings on the buggy.

### *Importance of New Knowledge*

It seems clear enough that the country as a whole is waking up to the need for science that will bring new knowledge in abundance. And we are getting more of it—much more—than we were getting 20 or even 10 years ago. The part I want to touch on is only the part of industry. Many businesses today must be asking:

"Should *we* be doing more basic research? How should we go about it? And what is our risk?"

Therefore what I shall mainly do here is lay out a few facts and judgments growing from our Bell System experience, and hope they will be helpful to other industries in coming to their own good answers.

Take first the question: "Is the quest for new knowledge something that really belongs in industry? Or does it belong rather in the universities and in government, with industry applying the results?"

I'll mention a few of the things our Bell scientists think about that, and reserve my own comments for later.

F. R. KAPPEL

They say: Certainly basic research must be done by the universities and government, but there is great advantage—and great need—to do it within industry as well. For this there are several reasons.

The first is that the interaction of basic research with the other phases of an industry stimulates everybody. Basic researchers and development engineers working fairly close to each other in a dynamic atmosphere sharpen each others' wits.

Why then should an industry choose to do without this stimulus—in fact, how can it afford to do without it?

A second reason is that the technical organization which includes a basic research group thereby takes out insurance against possible costly mistakes. The cost of development is far greater than the cost of research, and if a big undertaking gets off on the wrong foot the price is terribly high. Granting that any careful organization will try to guard against this, still there is no precaution quite as sound and sure as having basic research people right in the organization who are working at the deepest roots of the problem.

A third reason is that at any particular time, university scientists may not be working on the things that would do your business the most good. No matter how important their work is to them or to others, it may not be getting the new knowledge that *you* most need.

A good example is the work which produced the transistor. University physicists were busy on other things. Our Bell System research opened up the field.

Well, the scientists no doubt have other reasons; but these are enough for the moment. I said I would reserve my own comment and I will make it now. As a business manager, I think these points make sense. I think this for the very practical reason that these are some of the ways in which our basic research has worked well for us. How it may be for others, only they can decide.

### *Cost of Research*

Now let's think about costs. Of course the cost of research is a business risk. But in any field of business, if we face new problems we must take new action. If we face new danger we must take new chances. And if the danger we face is to fall behind in knowledge, then it seems to me that taking the new risk becomes imperative.

Moreover, while we shouldn't underestimate the cost, we shouldn't overestimate it either. The fact is that a large business can do a lot through expenditures which, in relation to total volume, ought not to frighten anybody.

Someone may say, "That is all very well, but you in the Bell System have a pretty stable business and you don't have to meet the same kind of competition that other businesses do." I won't argue the point because I don't think I need to. The fact is that we work under regulation and on a much lower profit margin than most big industry. We do basic research on a thrift basis and we get back far more than we put in. Others who have more ample resources would in my opinion get back at least as much as we do.

Really I think most of the hesitation about going into basic research is due to a worry that all the money may go down the drain. If you go at it the right way, however—and I'm coming to that directly—this ought not to happen. Even if it does take time to get results, when you put the cost into perspective with everything else a big business does, I don't, as I've said, see much cause for alarm.

Finally, if you will accept the proposition that we surely do have a new kind of competition to meet, and must have new knowledge to meet it, then I think it ought not to be hard to show the stockholders that knowledge-building dollars are a good risk against the ultimate calamity of having commissars run your business.

### *Success in Basic Research*

Now I shall summarize some of the principles we regard as necessary to the success of basic research in the Bell System.

The first is to get the best possible people. Getting new knowledge takes a special brand of brains. And they must

be well and deeply trained. Without this combination, nothing will be accomplished.

Second, you have to have an objective but you also have to give the brains full freedom. Maybe those two things will strike you as mutually exclusive. That hasn't been our experience. We have the broad objective of improving electrical communication. This is a perfectly clear goal. At the same time it gives the research scientist full scope for the exercise of his creative power. If you question this, I suggest you ask our scientists.

Now what is meant by freedom for the researcher?

For one thing he must be free to do what he wants to do in keeping with the broad objective, and knows he can do best. If a line of work is proposed and he says "no," take his word for it. He knows more than you do.

The scientist must also be free to plan his work in his own way. You cannot plan it for him. This means there are no schedules. There is no program by the clock or even by the calendar. After all, Isaac Newton was musing under a tree when the apple dropped on his head. The laws of gravity were not formulated on schedule.

The research scientist should also be free to publish his findings without undue delay. And you should also let him carry his work up to the point where he is sure its meaning is fully grasped by those who will go on with the development.

But it is right at this point that we bump up against the third and most difficult essential in maintaining basic research. This is to keep the researcher from becoming a developer. And this is the mistake that every research scientist will warn the business manager against. When basic research is swallowed up by development, then basic research stops.

The only assurance of getting new knowledge is to insist that the research group stay a research group. When one piece of research is done, the results must be given to others for development and the researchers must turn to a new basic problem.

Finally, basic research today needs adequate equipment. To give just one example, in our Bell laboratories research we study the basic characteristics of all manner of materials. To do this we must look at them in every possible way. This requires using many different tools, and they represent a not inconsiderable investment.

There is one thing I ought to emphasize particularly in this list of essentials. That is the disposition and temper of the manager who holds the purse strings. Of course he is itching for results. But he will have to be patient. And if you will let me speak personally for a moment, I will say just this: Whenever I get impatient, there are two thoughts I use to restrain myself.

The first is that research requires no more patience on my part than it does of the man who is doing the work. And the second thought that helps me is—thank heaven we have the research that I can be impatient about.

### *Good Men for Research*

So much for basic principles. But I daresay some of you would have liked to stop me right after the first one—that is, that success begins with getting the best and the best-trained men. Your questions might be, for example, "How do we find them? Isn't industry already taking too many of the best scientists away from the colleges? Are not these great difficulties?"

Certainly they are difficulties. Everything about research is difficult. Nothing is easy. And I don't say for a minute that industry is going to march ahead in research if public opinion and education and industry's own support of education don't march too.

Nevertheless our own scientists are convinced—and I am too—that if good men are genuinely and urgently wanted, step by step and year by year good men will be forthcoming.

In the Bell laboratories we spend time and money training men of promise who do not yet have the depth of training needed for research. We make arrangements with nearby universities for additional training.

Moreover there is no telling how many men with the capacity for basic research are now doing development work in industry because it is in that field, rather than in the search for new knowledge, that the most opportunity today is offered.

In short, the only way to begin is to begin. And I might remind you that there is more than one useful and thriving company at work today which literally got born doing research within the last few years. Their experience also throws light on another question, which is, "How long should it take, starting from scratch, to make real progress in basic research?" When I ask this of our own research people, their confident answer is that 10 years' effort will produce real accomplishment.

### *Research and Responsibility*

Now I shall close by inviting leaders in industry, and leaders also in government, to consider a single question. It is simple and short; merely this:

"What is our responsibility?"

For many years now big business has been under the necessity of justifying its existence. This is perfectly natural. Big business *does* affect the lives of everyone and it *must* continuously prove by its actions that everyone benefits. To me, and I daresay to you, the evidence of the benefits is overwhelming:

In the capacity to take on big jobs that depend on big investment.

In the creation of new opportunities for small business.

In the sheer ability to produce in vast quantity at low price.

In the strength that armed ourselves and our allies in two world wars, and but for which this country today might be an overseas province of, let us say, the Third Reich.

Our need to prove ourselves will never end, but I want to make this observation: It seems to me that at no time in this century has the man in the street had more reason or instinct to look hopefully and even prayerfully to big business than he has right now. He has a thunderclap awareness that it is big and mighty effort which has rocketed a living creature up out of the atmosphere and into the silence of space. His instinct and acknowledgment *must* be that the Soviets' kind of bigness can only be countered by another kind of bigness—and I mean our kind, which mixes bigness and freedom.

So I think today we have the *potential* for a new degree of public understanding of big business, and a new public awareness that the future depends very largely on big industry and on keeping it sound and strong.

To say this, however, is only to say that our responsibility grows accordingly. And if it should be—and I am putting the question to you—if it should be that industry should fall short, not in skill or ingenuity, or organizational teamwork, or productive or marketing savvy—not in any of these things, *but in getting new knowledge*—then what degree of public understanding and approval should we expect, say, 10 or 20 years from now? And is that the kind of risk we want to take?

In our own case, as a public utility, to do the most effective research job we need the full understanding and support of the regulatory commissions. We are regulated in every state, and in some of them you would almost think the sole purpose of the regulation is to keep us from earning enough money to do a better job.

In the postwar period as a whole this paucity of earning power has

*(Please turn to page 54)*

# THE Plant Man's Notebook

BY RAY BLAIN, TECHNICAL EDITORIAL DIRECTOR

RECENTLY, we enjoyed a trip by air from Washington, D. C. to San Antonio, Tex. The trip from Washington to Ft. Worth, our transfer point, was uneventful except that because of heavy rain and low ceiling we had to make an instrument landing. We then boarded Braniff for San Antonio where we again made an instrument landing. We were advised, however, that this was most unusual weather as the sun usually shines brightly on Texas.

While in San Antonio we visited Otto Koecher, signal corps communications engineer, and long-time friend of the writer. Otto has recently resurrected an old Edison phonograph—a real collector's item—from the attic of the old family home in Wisconsin. Strange as it may seem, this old phonograph, purchased in 1906 for $35.00, is still in excellent condition and operates as it did when new. Even the original leather belt is still in use.

Strange, also, is the fact that the reproduction sounds much better than would be expected in this age of Hi Fi. The old metal "morning glory" horn blasts a bit on the high notes, but, otherwise, the sound is excellent. The volume isn't high according to present-day standards, but this might be considered an asset.

Otto has a large collection of old cylinder records still in their original cases. The 2-minute records sold for 35 cents and the 4-minute ones for 50 cents back in 1906. The announcements at the start of each record and vocals by Ada Jones and Billy Murry brought back memories of our childhood when listening to the Edison phonograph during the evening was a real treat on the farm down in Oklahoma.

Before leaving San Antonio, we took time to again visit the Alamo, the shrine of Texas liberty. Built originally in 1716 as a mission, it was here in 1836 that David Crockett and about 180 men fought Mexican troops until all ammunition was gone, then used their guns as clubs and bludgeoned the foes that flowed about them—each Texan falling surrounded by bodies of the enemy.

•

Television at the Walter Reed Army Medical Center in Washington, D. C., has for several years been an increasing force in training and education programs. The educational possibilities were found to have such substantial value that new and more extensive facilities have recently been installed.

The original field sequential system has been replaced and expanded with compatible color TV equipment. Three interconnected TV centers have been established. The system is unique in that it employs the first color TV equipment designed specifically for medical instruction and demonstration purposes.

Experience with the color TV system originally installed at the Center has convinced the Army Medical Service that television can be an effective and potent force in training and education programs. The TV system permits an unlimited number of students to peer closely over the surgeon's shoulder, or view a microscopic field with the instructor. There need be no remote, back-row seats at televised demonstrations. Instructors have found that TV has an almost hypnotic ability to focus the students' attention; hence, TV often achieves results as good as direct instruction to small groups.

The Walter Reed installation is a three-channel system with seven color cameras, a color film system and three studios. It has a capacity of 150 training and demonstration programs per month.

Tests conducted to date have proved that it upgrades quality and cuts the costs of medical instruction.

•

The transatlantic submarine telephone cable which provides 36 voice channels was placed in service on Sept. 26, 1956. These circuits link both the United States and Canada with the British Isles.

The cost of a three-minute call between Great Britain and any point in the United States is $12 on week days and $9.00 on evenings and Sundays. These rates do not include the 10 per cent federal excise tax.

This is certainly a far cry from the old days when the first overseas telephone service was opened on Jan. 7, 1927, with a single radio-telephone channel between New York and London. The rate, at that time, was $75 for a three-minute call. Despite this high rate, nearly 2,500 calls were made between Great Britain and the United States in 1927.

•

We are informed by *Wood Preserving News* that a new stake test on termite protection has started under severe conditions of exposure at the Cary National Forest of the University of Florida. Committee D-17—Wood Preservation of the American Railway Engineering Association—is sponsoring the test which was two years in planning and preparation.

A total of 1,296 specimens and 30 untreated control specimens have been set in the ground at the site. Members of the research staff of the Association of American Railroads are conducting the test with the help of Dr. J. B. Huffman, University of Florida, and F. J. Fudge, timber engineer of the New York Central Railroad, who is chairman of the AREA subcommittee for this assignment: "Destruction by Termites; Methods of Prevention."

Preparatory work consisted of pressure treating 2 x 4 by 18-inch specimens of fir, pine, and oak at the United States Forest Products Laboratory, at Madison, Wis. Nine different preservatives were used with three different retentions for each. After treatment, 16 specimens of each species with each

## *always install C&D PlastiCal®*

Why? Because C & D PlastiCal® batteries are the most advanced-design batteries of the last 50 years.

PlastiCal lead-calcium alloy grids are completely free from the harmful life-shortening effects of antimony found in conventional telephone batteries. By comparison, a C & D PlastiCal requires from 1/10th to 1/100th the current to maintain itself in a fully charged condition. Thus, frequency of water additions is drastically reduced.

A PlastiCal in the battery room means you can check the electrolyte level by glancing at the clear plastic case. Patented, exclusive C & D Saftee-Vents reduce maintenance by serving as always-ready, efficient funnels for temperature and hydrometer readings—*without* removing the vent.

If you need telephone batteries—a C & D representative or your telephone equipment supplier will be glad to explain the many advantages gained by installing C & D's premium telephone battery—PlastiCal. *Call him today!*

***For details, write for descriptive Bulletin***

**C&D BATTERIES, INC.**

*of Conshohocken, Pa. ... Attica, Ind.*

SINCE 1906

SALES AND SERVICE OFFICES IN PRINCIPAL CITIES FROM COAST TO COAST

Manufacturers of *Slyver-Clad* ® Industrial Batteries • PLASTICELL and PLASTICAL® Batteries for Communications, Control and Auxiliary Power

different preservative and retention were selected for installation.

The stakes are installed vertically and spaced at 3-foot intervals in one direction and 4-foot intervals in the other. The committee expects it will be necessary to replace the 30 untreated specimens every year. Treated specimens will be inspected annually to determine the rate of termite attack and assist the committee to recommend the preservatives and retentions best suited to prevent such attacks.

•

Back in 1858, you could, for the first time, send a letter by overland coach to the Pacific Coast. The specified running time for the 2,800 miles from Tipton, Mo., to San Francisco, Cal., was 25 days. And that was considered a mighty fast schedule in those days.

•

We have recently had the pleasure of using a little testing device that beats anything of its type we have ever seen. Named the Model 1 Bleeper, it emits short bursts or "bleeps" of audio tone which are entirely different from all tones used in dialing and other tone signals used in telephone communication. This device is designed for use in tracing circuits or to locate faults in cable, main frames, central office equipment, etc.

This unit is adjusted at the factory to produce a "bleeping" tone when connected to any load varying from one ohm to infinity. Thus, in operation, it will provide a distinctive tone regardless of the condition of the cable pair or line. The normal output (which in 600 ohms is less than peak to peak) is sufficient to produce a tone which can be traced almost to the exact location of the short circuit with good quality earphones. The output power is, however, low enough to prevent the tone from crosstalking into adjacent pairs.

This neat little transistorized unit has a peak output of approximately 1V peak-to-peak in 600 ohm load. The Burgess Y10 battery, or its equivalent, has a normal life of approximately one year. This service life is based on 3 hours' use per day. Dimensions of the unit are 4¼ x 2¼ x 1½ inch and its weight is only ½-pound.

It is our opinion that this clever little testing device will prove its worth in any telephone exchange.

•

It is reported that over 3 million people in 300 cities throughout the nation dial the telephone time number daily.

# Plant Man's QUIZ

By RAY BLAIN, Technical Editorial Director

**Q. Will you please explain how to make a flash test of a cable splice?**

A. This method of testing is accomplished by admitting gas or dry air to a splice to build up a pressure of several pounds locally. The outside of the sleeve is then thoroughly soaped so that the escaping pressure from any opening will be indicated by bubbles.

•

**Q. Please give us any information you have on the proper lubrication of telephone dials.**

A. It is suggested that you contact the manufacturer of your particular type dials and obtain his instructions as to the proper lubricant and how it should be used. These instructions should then be followed implicitly.

•

**Q. Will you please furnish us some information on cable stubs, how they are used, and why they are necessary?**

A. Cable stubs are short lengths of cable, usually from 10 to 15 feet, that are bridged to the main cable, as a rule in a manhole. The size of the stub ranges from the same size as the main cable to which they are connected, down to the size of the branch cables that connect to them. The purpose of cable stubs is to provide access to a part or all of the conductors of a main cable without opening the main splice. It also permits new branch cables to be connected, existing branch cables to be removed or replaced, or the pair counts of the branches to be rearranged, without disturbing the main cable splice.

•

**Q. We would like to have information as to the power requirements for a transistorized subscriber's carrier system.**

A. We are advised that the power requirements for one type of subscriber's carrier have been reduced to a bare minimum through the use of transistors. The subscriber terminal will operate on commercial ac power or dc battery power. The central office terminal is arranged to operate from its own power supply or the central office power supply.

•

**Q. What is the recommended method of splicing rural and urban distribution wire?**

A. The best method—to our knowledge—is to use the recently developed Nicopress insulated splicing sleeves. These factory-assembled units are composed of three integral parts. The innermost part is a short, stout copper sleeve which insures high conductivity. The intermediate part is a tough plastic insulating sleeve completely covering the aforementioned copper conductivity sleeve, and extending a short distance beyond each end of the outer part which is a copper jacketed sleeve.

The splice is made with this sleeve by stripping the insulation from the wires for a distance of one-half inch. The wires are then inserted to the center stop of the inner conductivity sleeve. The first compressions are made with a hand tool about one-quarter inch from the center stop. This establishes good contact with the bare wire ends. Then, make the second compressions approximately one-third inch from each end of the unit. This action secures and seals the insulated covering on the conductor. The completed splice is absolutely water-proof and requires no tape or additional insulation.

•

**Q. When will it be possible to obtain extra-long cords of the retractable type? We frequently have customers who ask for these cords but to date we have not been able to provide them.**

A. Long retractible cords in color and in black are now on the market and may be furnished by your telephone supply house. The cord that is 18 inches, retracted, extends to approximately 9 feet. The cord that measures 30 inches, retracted, extends to a distance of 15 feet.

# Registration Open for USITA Engineering Course

THE Engineering Education Subcommittee of the United States Independent Telephone Association and the College of Engineering of Michigan State University, East Lansing, early this month plan to mail to all USITA member companies brochures and application blanks announcing the Second Annual Telephone Engineering Management Conference.

The conference, sponsored by the USITA in cooperation with the College of Engineering and the Continuing Education Service of Michigan State University, will begin on June 29 and will last through July 25.

A success last year, the conference is designed to give participants a more thorough knowledge of the engineering management problems that go with an expanding economy. For engineers, the conference offers a broader understanding of the economic factors involved in design and application of telephone plant. The Conference gives management personnel familiarity with engineering techniques used to meet equipment and facility requirements.

**Participants and instructors in last year's USITA Engineering Management Conference seem to be enjoying the program. They are pictured in front of Kellogg Center on the Michigan State Campus, East Lansing, where this year's conference will also be held.**

The course is divided into six subject areas, each with a different instructor. The subjects and faculty are:

(1) Fundamental Economic Concepts, Dr. D. R. Fusfeld of Michigan State University.

(2) Cost Considerations in Engineering Decisions, Dr. A. Gruehr, of Brooklyn Polytechnic.

(3) Engineering Fundamental Plans, F. Rahdert, General Telephone Co. of California.

(4) Operation Analyses, Dr. G. Jones of Michigan State University.

(5) Communicating Engineering Decisions, Dr. T. L. Dahle of Michigan State University.

(6) Technological Horizons, guest lecturers.

Guest lecturers and their topics are: Dr. J. D. Ryder of Michigan State University, "Semiconductor Theory"; W. G. Long, of Collins Radio Co., "Scatter Propagations"; V. N. Vaughan Jr. of American Telephone & Telegraph Co., "Data Transmission", and R. C. Stiles of General Telephone Laboratories, "Electronic Switching."

All faculty and lecturers at the 1957 Conference are returning. Subject areas have been modified for greater effectiveness by using information from questionnaires, filled out by last year's participants, faculty observations, and USITA evaluations and recommendations.

The conference can enroll 75 participants and the classes will be held in Kellogg Center on the Michigan State campus.

Participating in the conference last year were:

E. L. Barnes of Rock Hill (S. C.) Telephone Co.; W. B. Beckwith of Plastic Wire & Cable Corp.; J. J. Behan of Kellogg Switchboard & Supply Co.; C. R. Biggs and Irving Kolodny of General Cable Co.; M. S. Burton of Gulf States Telephone Co., Tyler, Tex.; E. L. Chapin of North Electric Co.; V. D. Chiodo of Bear River Telephone Co., Tremonton, Utah; Richard Christian of General Telephone Co. of Ill., J. E. Coffman of General Telephone Co. of Indiana.

Charles Connors of Lincoln (Neb.) Telephone & Telegraph Co.; J. R. Coughlin of General Telephone Co. of Upstate New York; C. L. Cox of General Telephone Co. of Iowa; W. M. Curtis Jr. of General Telephone Co. of the Southeast; A. C. Davies and E. C. Ellis of General Telephone Co. of the Southwest; T. H. De Hay and K. G. Madry of Southwestern States Telephone Co., Brownwood, Tex.; E. J. Dowejko and C. H. Knapp of Stromberg-Carlson Co; R. H. Fish of Lenkurt Electric Co.

Carl Hanenburg and J. W. Mallory of West Coast Telephone Co., Everett, Wash.; C. E. Harker of General Telephone Co. of California; H. J. Irwin and C. J. Williams of California Water & Telephone Co., Monrovia, Cal.; C. R. Jones of Carolina Telephone & Telegraph Co., Tarboro, N. C.; Judd and John Schleif of Hawaiian Telephone Co., Honolulu, T. H.; R. O. Karle of General Telephone Co. of Pennsylvania; W. C. Kimball of General Telephone Co. of Ohio.

Alexander Kohan, O. A. Krause and J. H. Vowell of Michigan Bell Telephone Co.; F. C. Laver of the Peninsular Telephone Co., Tampa, Fla.; Bliss McCann of Automatic Electric Sales Corp.; H. R. McDonald of Halls Telephone Co., Inc., Knoxville, Tenn.; Edward McKee of Central Telephone Co., Lincoln, Neb.; R. E. McKelvey of Western Carolina Telephone Co., Sylva, N. C.; R. L. Ohlson of General Telephone Service Corp., G. L. Rausch of General Telephone Co. of the Northwest.

D. F. Piske of General Telephone Co. of Michigan; G. H. Pohm of Lorain Products Corp.; F. R. Ritchie of North Carolina Telephone Co., Matthews, N. C.; George Shoemaker of Chenango & Unadilla Telephone Corp., Norwich, N. Y.; A. A. Wilson, Illinois Consolidated Telephone Co., Mattoon, Ill.; and Howard Wright, Ashtabula (O.) Telephone Co.

## General of Ohio Names Marketing Manager

Jack Boyd, former merchandising manager, has been appointed director of marketing and merchandising of General Telephone Co. of Ohio, Clare E. Williams, president, announced on Feb. 7.

Mr. Boyd began his career in telephony in the commercial department of General Telephone Co. of Pennsylvania, immediately after he received his discharge from the Army in 1946. His interest in sales developed as he stepped from commercial sales engineer to business office supervisor prior to his transfer to Marion, O., and promotion to district commercial manager in February, 1948.

Mr. Boyd became central division manager in 1951 and merchandising manager five years later.

## Joins N. C. Company

Vernon W. Chase, telephone engineer for the North Carolina Utilities Commission since September 1949, has resigned to accept a position with the Norfolk & Carolina Telephone Co., Elizabeth City, N. C., effective Apr. 1. His successor has not been chosen.

# THE Operator's Corner

By MAYME WORKMAN — TRAFFIC EDITOR

WE WERE ENJOYING a restful evening watching television when a singer was introduced on the program we were viewing. She was lovely to look at, but when she started to sing, my friend, a chief operator I formerly worked with, said, "She has a rigid jaw."

After observing the singer for a moment, I agreed, "She surely does."

My friend said, "Why don't you write an article about the voice drills you taught us when you conducted schools for chief operators and supervisors? I think they helped us a great deal. I taught them to my operators. They were not thrilled about them at first, but after they got into the swing of them, they enjoyed them."

Simultaneously, we started to repeat the sentence we used for a "rigid jaw," "Drop the jaw a little bit more and use the lips more freely." The singer was forgotten for the time being as we refreshed our memories going through the voice drills.

To please my friend and, perhaps to help an operator who may be having difficulty with one or more of these problems, here are the sentences we used for the following defects:

(1) A rigid jaw—this results from not opening the mouth wide enough to let the sounds come out. Operators were instructed to place their middle and index fingers in the mouth, without touching anything. This necessitates opening the mouth very wide. They were told if they experienced an uncomfortable feeling behind their ears, they were probably not opening their mouths wide enough in speaking.

A number of years ago, a dentist, knowing I was engaged in telephone work, asked me, "Why is it that people have difficulty in understanding me when I speak to them, especially patients?"

I facetiously replied, "Perhaps you scare them and they are unable to concentrate. Seriously, you are not opening your mouth wide enough when you speak, doctor. I have difficulty in understanding you, too. I have observed your mouth when you are talking, and you actually speak through your teeth. This is a common speech habit. One of my friends not only fails to open her mouth wide enough when she speaks, she turns her head away while she is speaking. This adds to the problem of trying to understand what she is saying. You certainly cannot make friends and influence people a la Carnegie, when they are unable to understand what you are saying. Try opening your mouth wider when you speak, doctor, and you will be saved the annoyance of repetition."

(2) Stiff lips—To correct this condition, we used the sentence, "We wish we were where Winnie Winkle went." We would repeat the phrase over and over, and by the time we had finished, chief operators and supervisors, were expert puckerers.

Failing to use our lips properly in speaking also makes it difficult for others to understand what we are saying. Often we hear the expression, "What did you say?" These queries are usually the result of having a rigid jaw, stiff lips, or both.

(3) Lazy tongue—"Oh no, not women!" the men would exclaim when I was instructing them in the proper use of their organs of speech. "Yes, women" I would reply and, if you will observe an ordinary conversation between two women, you will find that this is true. Men, too, have lazy tongues, and according to some of them, they say they rarely ever get to use them.

They have also stated, "That is why we refer to a language as the "mother tongue," because mother is the only one who has a chance to use it." While we do our share of talking, men usually do their share, as you can readily observe when a group of them get together. Having addressed many civic organizations, I could close my eyes and, except for the voice tones, it could have been any group of women who were having lunch together.

The sentence used for overcoming the handicap of a "lazy tongue" was, "Little Tommy Tucker tiptoed on top of the table." Invariably, one or more would say, "Liddle," failing to cross the "T." Then we would start all over again. By crossing each "T" in this sentence, the tongue was exercised and, by repetition, voice faults were overcome.

We have found, from experience, the three common faults of speech among telephone operators, as well as among average people are:

a. A rigid jaw.
b. Stiff lips.
c. A lazy tongue.

Since unnecessary repetition over toll circuits results in waste of toll circuit usage and is annoying to customers and other operators alike, operators may wish to practice these exercises to overcome common speech faults. Group practice is always interesting and more fun.

To be a good conversationalist in every day life is also important, and we cannot hope to be, if we fail to use our organs of speech properly.

Having the proper use of our organs of speech, we are ready to develop a pleasing voice personality, in our work and in our social life. Beauty alone is not sufficient. We must also develop a beautiful manner of speech, pleasing tones, proper use of our organs of speech, and good diction. Everyone is not gifted with a beautiful face and figure, but a beautiful voice is within the reach of almost anyone who puts forth the effort to develop it. Such a voice is a real asset and many a plain face is enhanced by the beauty of the individual's voice. And, in like manner, many a beautiful face and figure loses much of its charm by a rasping, shrill, undeveloped voice.

Speak clearly, develop a well modulated voice, and, above all, speak kindly, and you will be readily understood, both at the switchboard and in your private life. Your customers and your friends will appreciate the effort you have put forth to develop a pleasing

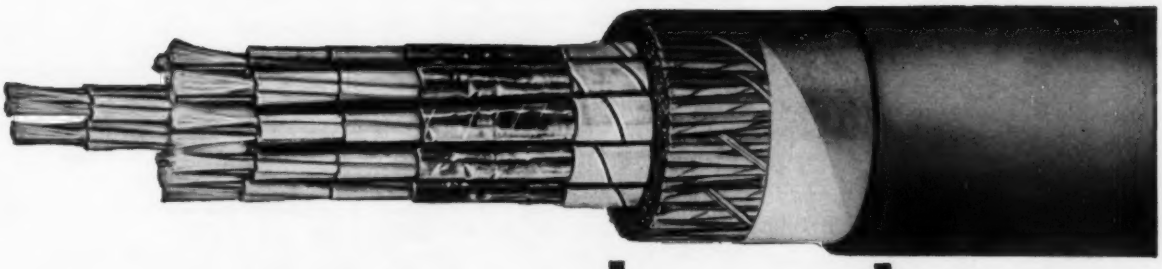
*(Please turn to page 55)*

## Will you be ready with

# VIDEO PAIR CABLES?

General Cable, *alone* among the independent cable manufacturers is producing cable of this new and improved design. Why? To help you *now*, under your current expansion programs, get ready for the mass of technical, recreational, educational and specialized data of all kinds that will have to be carried over public communication systems.

General Cable video pairs may be had combined with any type of telephone cable construction, or as pairs alone, properly sheathed for whatever type of installation you may require. Contact your nearby General Cable representative. It will pay you to be ready today for tomorrow's new business.



### VIDEO PAIR

Balanced broad band transmission circuits* for video and carrier—closed circuit TV—links to microwave stations —remote TV pickup—digital data transmission.

- *Low signal to noise ratio
- *Low attenuation
- *Low shield resistance
- *Low noise and cross talk levels
- *Small phase distortion
- *Low echo suppression

### VOICE AND CARRIER

Telephone circuits.

### SHEATH

Aluminum Lead
Stalpeth Alpeth
for aerial or duct installation

*Also available with armor for direct earth burial or submarine use.*

*Distributed through:*

AUTOMATIC ELECTRIC SALES CORPORATION
Northlake, Illinois

LEICH SALES CORPORATION
Chicago, Illinois

**GENERAL CABLE CORPORATION,**
420 Lexington Avenue, New York 17, N.Y.
Offices and Distributing Centers Coast-to-Coast

***for quality and service... specify*** **GENERAL CABLE**

*TROUBLE CLEARING*

# Our Schools and Public Opinion

By L. N. MARTIN

IN ONE of our recent articles (TELEPHONY, Dec. 7, 1957, p. 40) we discussed the American high school in connection with the selection of new telephone employes. We are pleased to learn that this article was well received by many of our readers.

The controversy over preparedness and education still goes on. It fills the newspapers and is heard on the radio every day. What has happened to this country?

Two sputniks went up and a large part of our people went into a panic. Some thought that the world was coming to an end—or at least our part of it was doomed—that this country had lost overnight all of its scientific knowledge and know how.

Panic affects people in different ways, a fact that may be observed at the scene of any serious accident or disaster. Only a few go about the immediate work of rescue and first aid. Others offer their services and if not needed they keep out of the way of those who are working. However, this useful group is outnumbered by those who display characteristic symptoms of panic and hysteria.

We hear one man giving orders in a loud voice, but no one pays any attention to him and he makes no move to carry out his own commands. Then, there is the man who criticizes every move that the workers make, but he offers no constructive suggestions. Another rages against whoever is responsible for the accident; he is looking for a scape goat. And, there will be many who go completely berserk, cause confusion, and get in everyone's way.

Many of these characters may be seen in the present national emergency. We should be thankful that this country has a leader who does not panic.

It is quite evident that our schools have some faults that must be corrected. What are these faults? There is little criticism of our colleges and universities. They are turning out scientists who are equal to any in the world. The trouble is that not enough young men are matriculating in the science courses that the colleges offer. One reason given for this situation is that our high schools are not turning out enough graduates who have the ability, inclination, and determination to take up scientific careers. It is also claimed that the high school graduate who cannot, or does not wish to, go on to college is not well enough equipped with science and mathematics to meet the conditions that exist in this scientific age.

**PART 63. The preceding article in this series appeared on page 22 of the Jan. 18 issue.**

One of the letters which commented on our recent article was from Jan K. Moller, who heads the engineering department of the Litton (electronic) Industries in California. Mr. Moller has had the same experience which we encountered when he interviewed high school graduates asking for employment in his department. In addition, he found that 50 per cent of these graduates could not spell plain English words. This indicates to him that their English training could not have been emphasized at the cost of their science education.

We will quote a portion of Mr. Moller's letter:

"Rather than lament the sad state of affairs in science education (and spelling), I would like to suggest a remedy that I have seen work with excellent results without imposing undue restrictions on the individual schools. Why not institute a federal norm of minimum requirements in mathematics, physics and chemistry, that clearly spells out how much algebra, trigonometry, geometry, etc., each high school student should master, and make its use voluntary.

"The norm could be set up by the Department of Health and Education in consultation with the major universities of the U. S., and written examinations, with similar questions throughout the country, would be held a number of times each year. It would then become a matter of pride with each high school to have as many students as possible pass this examination, and this would surely reflect not only on the quality of the students' knowledge, but also on the selection of subjects taken.

"The present system with elections and specialization throughout the course at many high schools is, in my opinion, one of the major reasons for the poor average education of Americans and reflects more of the high school's desire to pass the student through the school smoothly than an effort to give him a well-rounded education.

"The requirements of the federal norm would, of course, be set centrally, and the option of the individual high school to graduate, or not graduate, a student from that school would still remain.

"Would the young men and women of the U. S. be interested in such a strict (and moderately difficult) examination? My own answer is an unconditional yes. As soon as they find out the benefits of having passed a qualified and universally accepted examination, that the universities and industries will give preference to such graduates, and their tasks in institutions of higher learning are immensely easier, the rush will be on.

"Even West Point is today forced to give prep courses in mathematics because the average knowledge in this subject is so low among the cadets. Also about half of the technicians in my own department are now going to night school, as they have found that their regular education is not sufficient. And they like it!"

Mr. Moller's plan points the way to a solution of our school problem that does not require new laws, coercion, or federal control. The results would be obtained by *public opinion*, which is one of the most powerful forces in a democracy. Control would remain, where it belongs—in the states and the local communities, and it will cost the taxpayers less, as disbursements

made at the local level can be more closely supervised.

Public opinion includes *employer opinion*, and employers include all business and industry, also the state and national governments. When public opinion is crystalized and has been given publicity, the schools and the students will fall in line. Our young people are not so stupid that they do not wish to make a good living, and when public opinion convinces them that the only way to a good job is by hard work in school, they will tackle the more difficult courses.

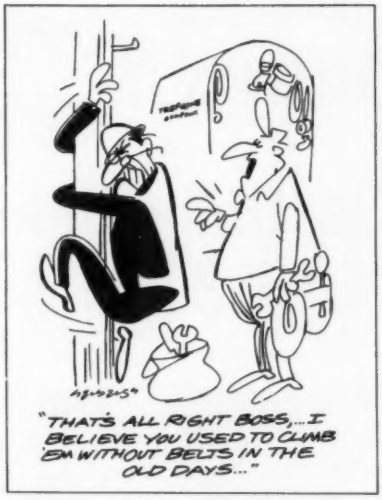
Many times, we have heard the statement that high school freshmen, given a choice of studies, often select those that they consider easy and avoid those studies that they have been told involve hard work. We recently did a little checking among high school students and found that this charge is justified. We were amused at one girl student's answer. She said: "Yes, the boys always pick the easy studies, but we girls like to learn things and we ask for the more difficult courses." (Shame on the boys!)

If a major portion of our youth is looking for the easy way and are not facing the challenges of life in their school days, this country is indeed in grave danger. But, is the public opinion of adults doing its part? When a boy, whose only ambition is to "get by" and get a diploma with as little work as possible, finds himself ostracized by public opinion and learns that industry will not give him a good job and his high school (having now become more strict) will not even give him a diploma, he will take a new look at life.

We can remember the time when very few boys and girls entered high school. The majority quit and went to work after the eighth grade. When most of the employers began to demand a high school diploma, this was changed. The students and the schools responded to public opinion. The employers will now have to take another step. A diploma, however ornate it may be, is not enough. The employer must insist on proof of accomplishment along lines that are most useful in his particular business.

In this connection, it is our belief that if the applicant proves that he has the required knowledge and ability it does not matter where or how he obtained it. According to the strict ruling of some employers, Abraham Lincoln would be denied a job because he had no high school diploma.

In our previous article on education, we discussed what the telephone industry should ask of the high school. Certainly no telephone company would expect the high school to produce a




telephone man. The high school should not attempt to become a vocational school. We *do* expect the high school graduate to have acquired all the science and mathematics that can be given at the high school level and, at the same time, a well-rounded course in English. Are we telephone people making our wishes known to the school authorities?

The telephone industry also uses men with college degrees in science, electrical engineering, electronic engineering, and related subjects—also graduates of technical schools. To this end, the high school should have a college preparatory course which will make it unnecessary for these students to spend one or two years in a prep school before taking up their college work.

While thus discussing education freely, we are not forgetting that we are not in the education business. (However, all telephone supervisors are teachers, in that they must teach the telephone business to the boys that the schools turn over to them.) The educators doubtless have many problems of their own which are entirely unknown to telephone people. Nevertheless, the user of a product may take the liberty of appraising that product, and the product of any school is its graduate.

Another problem of higher education in America is that, notwithstanding the fact that our colleges and universities are partially supported by taxes and endowments, the cost to the student is still high. This tends to limit higher education to those students whose parents have ample means. Obviously, we must ultimately work out a plan by which any student who can prove his ability and determination to acquire higher education will not be denied it for financial reasons.

Some progress has already been made in this direction. Many large employers are now offering scholarships based on ability and competitive examinations. It has been suggested that the federal government also offer such scholarships. Offhand, this idea does not seem to involve federal interference with our local school systems, but this plan should be approached with caution. Federal disbursments have a way of falling into the wrong hands, or of being used for political purposes. We believe that ultimately our universities will be free, *but only to those students who prove by their work in high school and by passing rigid examinations that they are capable of taking the proposed course and then giving the country the benefit of their new knowledge.*

Some people are comparing our school system with that of Russia in a way that places our system in a very unfavorable light. They had better first get all the facts. There are things in the communist system that we do not want at any price. In Russia, education is *by* the state and *for* the state. The happiness and welfare of the individual are not considered except as they serve the interest of the state. In the days when slavery was prevalent throughout the world, a slave who had exceptional ability was often well rewarded. So long as he was faithful to his master he could have nearly every thing that he wanted *except his freedom.* While we hear much about the scientists that the Russian schools claim to have developed, little is said about the fate of the vast number of students who do not reach the summit.

In our discussions of education, we have said nothing about women. The telephone industry uses a large number of women and the employers in those departments who employ women are doubtlessly concerned about the schools. However, this writer has had very little experience in the employment of women and he will, therefore, leave this subject to someone who is better qualified to discuss it.

There is one subject that should be taught in every American school from the kindergarten to the last year of college and that is the American System of Democracy and Free Enterprise, which has produced the greatest and most widely spread prosperity and happiness in the world. The greatest threat from Russia is not her ICBM but is her diabolical propaganda. Some say "It can't happen here," but he who listens will hear the communist line talked, not only among the ignorant and discontented but even in our halls of learning. To crush this thing in its infancy is another job for *public opinion* and education.

# NEW DEVELOPMENTS

# in Independent Telephony

By RAY BLAIN

THIS is the fifth article in a series of five, in which our technical editorial director describes various new items of equipment of interest to all progressive Independent telephone companies. The fourth article appeared in the Feb. 22 issue. Readers desiring more information on any of the products described may write to Mr. Blain in care of TELEPHONY.

* * *

*Resonant Reed Oscillator Controls (Fig. 62).* The Frahm frequency sensitive resonant reed relay and resonant reed oscillator control are used in equipment for signaling, remote operation and supervisory control. This equipment consists of a tone signal generator and a tone signal detector, each with a suitable power supply.

The reed oscillator controls are used in the tone generator to keep the output signal frequency within a tolerance of plus or minus 0.15 per cent required for reliable operation of the system.

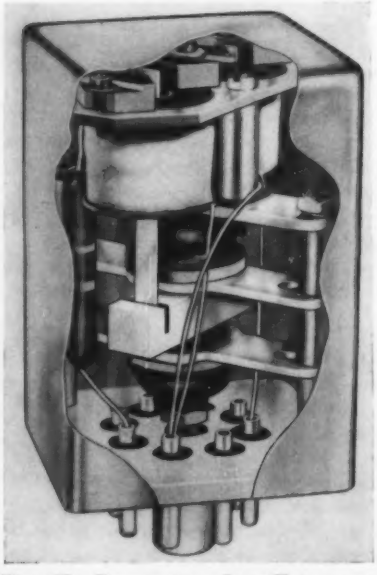


**Fig. 62. Resonant reed oscillator controls.**

The reed relays are used in the detector to decode the transmitted tone signal and to initiate the desired action. The electronic equipment in which the reed relays and oscillator controls are used varies much in design according to the specific requirements of the application. In the first instance, these differences in design are due to the transmission system used, whether the transmission is by radio signals or over wires; for instance, leased telephone lines.

•

*Telephone Cable Pressure-Guard (Fig. 63).* Cable pressurization is a method of maintaining communication circuits free of electrical leaks due to the presence of moisture. Storms, age cracks, insects and rodents are among the many sources of cable damage which can cause the entrance of moisture. A positive internal pressure prevents this, but, due to the high resistance of the cable to the flow of gases, the leak area may reduce to atmospheric pressure long before remote flow indicators or roving service crews can detect it. The cable pressure guard increases line resistance as a result of detecting a pressure drop from the area that it is protecting. The increased resistance can then be detected by a central monitoring source, thereby localizing the cable leak.

The pressure-guard assembly consists of a bellows load-spring tension or setting adjustment and plunger. The load-spring creates a force in opposition to the movement of the bellows. As pressure is introduced, the bellows expands against the force of the load spring and the movement is then transmitted by means of the bellows plunger to the snap-acting switch. Thus an electrical circuit is opened, closed or transferred. Conversely, when pressure is reduced, the tensions set up by the load-spring insures that the bellows will contact and thus the operation is reversed.

**Fig. 63. Telephone cable pressure-guard.**

The pressure-guard is designed to sense a critical drop in pressure and set up a warning to the central office so that repairs can be made with a minimum delay. These detectors are pole-mounted at intervals along the cable which may vary with local conditions. When the pressure drops below the present value, the control switch closes and applies a 330,000-ohm resistance across any selected working pair in the cable, making it unnecessary to reserve communication circuits for pressure signal purposes. The resistance value is such that interference with normal subscribers' service is negligible.

•

*Continuous Flow Cable Pressure System (Fig. 64).* Continuous flow cable

pressure systems differ from static systems in that the cable is maintained under constant pressure from a source of nitrogen gas or dry air. This insures protection at all times for both underground and aerial cable. Small leaks may normally be expected in all cable systems and if they remain small they will have very little effect on the

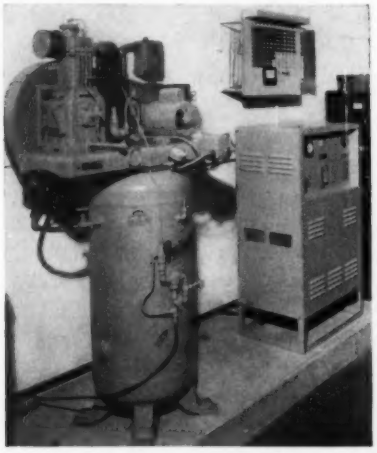


**Fig. 64. Continuous flow cable pressure system.**

protective pressure system. Any cable system will consume a normal amount of gas or air daily. The amount consumed will depend on the type of sheath, its length and condition.

Operating companies have agreed in general that it will prove economical to maintain an exchange cable distribution system under pressure with dry air supplied by a compressor-dehydrator when the normal gas consumed is 25 cubic feet, or more, per day. When the daily consumption, on a cable system, averages less than this amount, nitrogen gas furnished from a multiple tank system will generally prove more economical. When a compressor-dehydrator is used, it is considered desirable to engineer the system so that not more than 75 per cent of its rated capacity will be required to maintain pressure on the system.

In some cases, it may prove desirable to use both a multiple tank gas supply and a compressor-dehydrator. This arrangement will provide continuous pressure in the event of a failure of the power supply to the compressor. Then, also, the gas may be used during leak location work to prevent overloading the compressor.

•

*New Wall Telephone (Fig. 65).* This new instrument is available in eight decorative colors—selected after a careful study of trends in consumer preference—and white or black. Retractable cords in matching colors are furnished as standard equipment.

This telephone can be installed quickly and easily. Once the Tenite plastic housing is removed (by loosening one recessed, front-mounting screw), the installer fits the base over one screw into a "ke-hole" slot, adjusts for verticality, and tightens a second mounting screw.

Placement of the housing screw front-mounted eliminates the need for leaving space below the telephone. The installer can then place the wall telephone wherever the subscriber wishes —as close as necessary to the top of

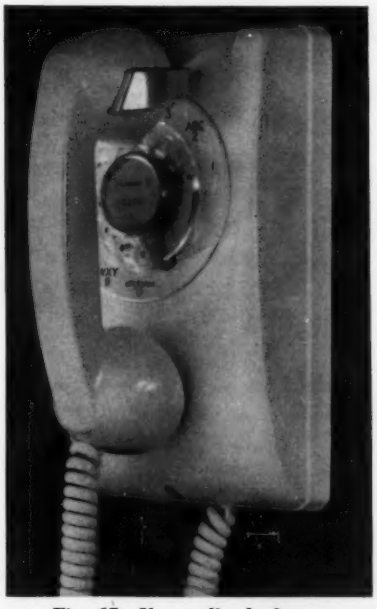


**Fig. 65. New wall telephone.**

work benches, tables or counters for full convenience of both user and installer.

In this instrument, the handset, of light-weight Tenite plastic, is placed squarely in front where it can be reached easily. The new hookswitch mechanism is arranged to easily make the change-over to two-step operation. By relocating the spring of the hookswitch mechanism, plus some quick changes in wiring on the network, the instrument becomes a two-step telephone. The subscriber lifts the handset to determine if the line is busy; then, by nudging the handset cradle to the left, he is ready to dial or talk.

The manufacturer claims this new telephone has full-range, higher efficiency transmission and reception; fully automatic equalization network; single coil, high impedance ringer, available in all standard frequencies; and a reliable coil-capacitor unit.

•

*Inband Signaling Equipment (Fig. 66).* This voice-frequency signaling system provides the facilities for adding ringdown or E and M signaling to physical or carrier-derived four-wire voice-frequency circuits.

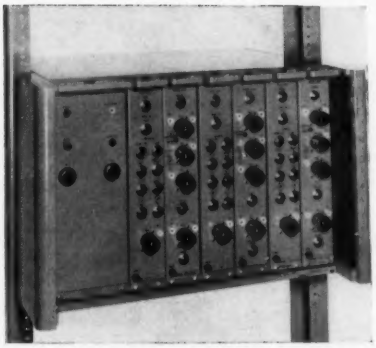


**Fig. 66. Inband signaling equipment.**

The method of signaling is of the inband type, i.e., the frequencies used for the signaling intelligence are in the same band occupied by voice transmission. It is claimed that a high voice quality is obtained with this method because the speech band width is not restricted to accommodate out-of-band signaling frequencies. The system operates so that all signaling tones are off during talking. The signaling is immune to interference from—and cannot be falsely operated by—voice transmission, it is stated.

Each channel terminal of this equipment contains a voice-frequency hybrid circuit to adapt the four-wire voice frequency system to two-wire operation. This hybrid circuit may be operated with an internal compromise balance network or an externally applied precision balance network. Dial systems may be operated either two- or four-wire; ringdown systems must be operated on a two-wire basis.

One channel terminal is required at each end of the voice-frequency circuit. Each terminal cabinet has a capacity of three-channel signaling facilities. Channel equipment may be transferred from or added (up to a total of three) to a terminal without affecting the existing channels. One power supply unit in each terminal supplies the power required for all terminal equipment. When signaling facilities for more than three voice circuits are required, additional completely independent terminals may be stacked as required.

Except for power supply, each channel signaling equipment is independent of the remaining terminal channel equipment and may be operated for either ringdown or E and M dial signaling. The equipment does not provide for signaling ringdown in one di-

*(Please turn to page 60)*

# today's Highlights

## of finance-taxes-business trends

*by Willard F. Stanley*

BOND PRICES HOLD HIGH: The rise in bond prices continued through January, but the upward trend was moderate and didn't approach the rapid pace of the previous two months. Yields on new offerings of single "A" rated bonds of electric utilities were lowered from 4.05 per cent on bonds of Columbus & Southern Ohio Electric (Jan. 8) to 3.85 per cent on Alabama Power bonds offered Jan. 17. But, February showed a reversal of this trend with a 3.90 per cent rate for similarly rated bonds of Central Power & Light (Feb. 5). The trend reversal was later confirmed by the 3.80 per cent yield applicable to the double "A" rated offering of Indiana & Michigan Electric bonds (Feb. 13) as compared with 3.60 per cent to 3.65 per cent yields on similarly rated electric utility bonds a few weeks previous.

A phenomenon of February financing was that only two issues of utility funded debt (both electric and aggregating 37 million dollars) came to market (or were scheduled for offering) through Feb. 19. This sparcity of offerings is rapidly reversed in the ensuing 11 business days (Feb. 20 to Mar. 6) when no less than 14 utility funded debt issues, aggregating 323 million dollars in principal, are scheduled for offering. From Mar. 7 through Mar. 31 122 million dollars of new offerings of utility funded debt are presently scheduled.

If the market can successfully cope with the excessively crowded Feb. 20 to Mar. 6 schedule, it should be able to carry on normally for sometime thereafter. It seems most unfortunate that this overcrowding couldn't have been alleviated by mutual cooperation between the issuers involved in accelerating or deferring offering dates.

Wall Street Journal's tabulation of 14 new utility funded debt issues, shows, at Jan. 13, an average yield, based on bids for these new offerings, eight decimals (0.08 per cent per annum) lower than the average yield on the basis of their original offering prices. This is considerably less than the 25 decimal (0.25 per cent per annum) improvement reflected in the similar tabulation at Jan. 10, but still indicates a trend favorable for funded debt borrowers.

Recent downward flow of interest rates on short-term debt has been even more outstanding than on long-term issues. For instance, 90 day treasury bills yielded less than 1.75 per cent at Feb. 15, vs. something like 2.75 per cent a month earlier and as high as 3.75 per cent only a few months previous to that date.

*(Please turn to page 38)*

**Mr. Stanley, formerly a utility financial executive, is now president of Corporate Services, Inc. of New York City and is well known as a financial writer. He is a member of the Controllers Institute of America and the New York Society of Security Analysts. He serves on the Finance Management Committee and the Tax Committee of the Controllers Institute (N. Y. Control). His articles are appearing once a month in TELEPHONY.**

**For telephone line wire**
*. . . bare or insulated*

**For rural distribution wire**
*. . . guy strand or messenger*

# COPPERPLY®

## COMMUNICATIONS WIRE

Copperply wire introduces a unique combination of advantages and economies. For example: better balancing of circuits, suitability for future carrier circuits without additional line work, extended service life, improved long span installation, and sizeable economies both in insulating the wire and in line construction.

These gains stem largely from precise concentricity, linear uniformity, and a non-porous rust proof copper coating permanently united with a high tensile, precision-drawn steel core, as well as availability in continuous *non-welded* lengths up to 1,000 pounds.

Copperply is now available in High Strength and Extra High Strength grades, with either 30% or 40% conductivity, and in all standard sizes from No. 3 to No. 14 AWG.

Bulletin 202 gives additional data. Write National-Standard, Niles, Michigan.

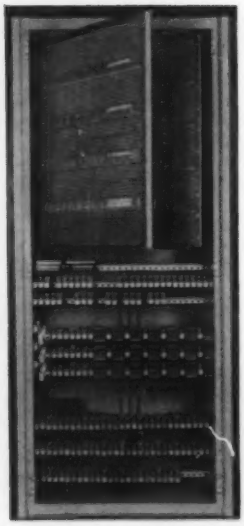
**NATIONAL** NS **STANDARD**

DIVISIONS: NATIONAL-STANDARD, Niles, Mich.; fine wire, stainless, music spring and plated wires • WORCESTER WIRE WORKS, Worcester, Mass.; music spring, stainless and plated wires, high and low carbon specialties • WAGNER LITHO MACHINERY, Secaucus, N. J.; metal decorating equipment • ATHENIA STEEL, Clifton, N. J.; flat, high carbon spring steels • REYNOLDS WIRE, Dixon, Ill.; industrial wire cloth

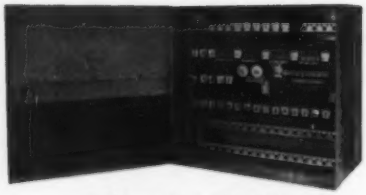
# NOW AVAILABLE *at nominal cost*

## FOR ANY SIZE INSTALLATION

FROM 40 LINES UP IN INCREMENTS
OF 20 LINES



Cabinet 84"x36"x12
Capacity 30,000
Stations, TPL or TPS
or Any Combination
of Both



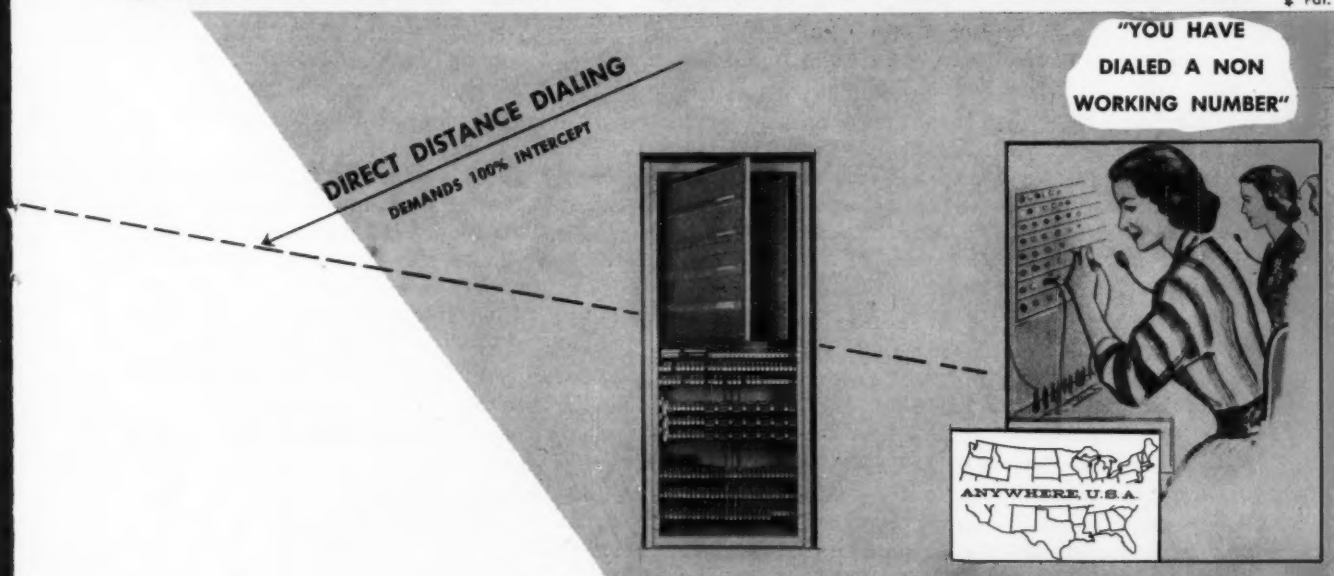
Cabinet 19"x17"x8"
for Rack or Wall
Mounting. 40 Lines
TPL — Illustrated

**SELECTIVE (TWO-WAY) INTERCEPT** is available to route calls for changed numbers and disconnects to operator, others to recorder, or other variations as desired. Advanced technique of printed circuitry is used in this equipment. The Magnetic Impulse Counter is the basic unit of the computer register circuits, supported by standard telephone relay apparatus of recognized manufacture.

**Other UNIVERSAL Telephone Equipment: DIGIT ABSORBER for 2-5 Numbering Code-to-Selective RINGING CONVERTER**

# UNIVERSAL 100% COMPUTER INTERCEPT*

* Pat. Pe




Buy the ultimate requirements in intercept equipment. Not "merely adequate" . . . not 20% . . . not 99% . . . but 100% intercept is the ultimate requirement for direct distance dialing. Universal Computer Intercept offers 100% intercept at nominal cost, compatible with any make switchboard, and easily inserted anywhere in the dialing train. The unit is completely factory wired and may be installed by regular maintenance personnel. Simplicity of design lends to minimum maintenance requirements.

**CHECK THESE ADDITIONAL BENEFITS OF UNIVERSAL COMPUTER INTERCEPT**

- ✓ **Increase Schedule A Commissions.**
  Your TPL will have the effective features of TPS intercept to add to your toll settlement.
- ✓ **Increased Revenue through Increased Trunk Usage Time.**
  Reduce the repeated attempts on long-haul toll calls that keep valuable toll switching apparatus tied up.
- ✓ **Savings in Time and Material in Adding Intercept Service to your Operation.**
- ✓ **Intangible Advantages.**
  - Immediate intercept of calls to busy lines for non-working or changed numbers on these lines.
  - Intercept of incoming toll calls by request of customer or commercial department.
  - Many others of commercial value.

**UNIVERSAL**
CONTROLS CORPORATION
OFFICE AND PLANT – CARROLLTON, TEXAS
MAIL ADDRESS – P. O. BOX 13122, DALLAS 20, TEXAS

**KELLOGG**
A DIVISION OF IT&T
6650 S. CICERO, CHICAGO 38, ILLINOIS

**SALES OFFICES**

5924 S. PULASKI RD. CHICAGO 29, ILL.
1515 TURTLE CREEK BLVD. DALLAS 7, TEXAS
4501 TRUMAN ROAD KANSAS CITY 1, MO.
1555 WEST FOURTH STREET MANSFIELD, OHIO
23 BRODERICK ROAD BURLINGAME, CALIF.
1594 SOUTHLAND CIRCLE, N. W. ATLANTA, GA.
6100 EXCELSIOR BLVD. MINNEAPOLIS 16, MINN.
165 PROSPECT STREET PASSAIC, N. J.

MAIL THIS COUPON TO THE NEAREST ADDRESS

Gentlemen: I am interested in your Universal COMPUTER INTERCEPT.

NAME_____
POSITION_____
FIRM_____
ADDRESS_____
CITY_____ STATE_____

T-3-1

Consensus of informed predictions still points to even lower long-term interest rates during 1958. There seems to be only one adverse possibility, i. e., that the U. S. Treasury may endeavor soon to fund a substantial amount of its short-term debt into long-term bonds. Announcement of a similar policy touched off the debacle in bond prices early in 1953, causing a rise in bond yields of something like 1 per cent in a few months.

However, the results of the recent exchange offer with respect to federal securities didn't materially affect the market. This may not be a fair test, as the new 32-year maturity was offered only as an optional exchange, with only about 1.75 billion dollars being selected in that maturity, despite unusually liberal yield on these bonds. Only about 15 per cent of the total federal publicly-held debt now matures in 10 years or more from its date, so there is strong pressue to fund additional short term obligations.

The danger here lies in the treasury proposing sale of a substantial amount of long-term bonds for funding purposes (say 5 billion dollars or more). This might siphon into this long-term federal issue a significant part of the funds otherwise available for new funded debt of utilities and industrials. But, informed opinion seems to feel there is little likelihood of this happening, the writer, while inclined to agree, is not quite so sure.

Despite prevailing optimism as to the future of long-term bond yields from the borrowing standpoint, we feel that utilities requiring this kind of money in the near future will do well to proceed promptly with their offerings—trying, also to avoid coming to market in periods of overcrowding, such as the Feb. 20 to Mar. 6 interval mentioned above.

Market values of most utility common stock equities improved in January-February, making it increasingly advisable to raise this type of money at current levels to cover needs for a considerable forward period—a year or more. So, the "green light" which has been discernible so long for common stock offerings, seems to be shining brighter than ever.

* * * *

STOCKS SEEM TIRED AGAIN: After a smart rally following the turn into the New Year, the stock market seemed to become easily exhausted and has dropped back, at this writing (Feb. 19) to lose a good part of the average price increase for 1958. Nevertheless, the market has given a fairly good account of itself, considering the fundamental and important adverse factors with which it has been faced, such as lower car-loadings, dip in business activity, numerous dividend cuts and omissions, spotty earnings comparisons, and, finally, increase in January unemployment to the highest in the past eight years.

Everyone seems to agree that there's a recession going on. Difference of opinion is as to when it will end. The administration seems hopeful for rapid revival of business activity; perhaps unduly so unless it acts as well as it speaks, but some of the leading economists don't look for revival until after Fall of this year.

As usual, the stock market will probably start discounting the better days to come long before they arrive. On this theory, a favorable turnout marketwise might be looked for sometime this Summer, in anticipation of a Fall or Winter revival. Many stocks seem likely to push lower before they turn upward again. On the other hand, wholesale liquidation seems unjustified at present levels, although continued care in selection of new investments remains paramount.

Utilities still seem to offer the best combined advantage—defensive protection, plus possibility of gradual appreciation due to earnings and dividend increases.

New York Times 50 stock combined average was 2 per cent above the 1957 close at Feb. 18. At Jan. 15, this average was about 4 per cent above the last year end prices.

Space limitations prohibit income tax discussions this time, but our next column will give some 1957 court tax decisions affecting tax liabilities of corporations and individuals.

# TELEPHONY'S Traffic Engineering Handbook

By Gilbert R. Brackett

March 1, 1958

## Section 11 (continued)
## Miscellaneous Traffic Information

### Average Holding Time

2 second wait before dialing.
10 seconds to dial seven digits.
20 second wait for called party to answer.
1 second for disconnect.

The average entire holding time for a seven-digit number is approximately 30 seconds.

The average length of talking time is 130 seconds.

### PER CENT CALLS BUSY HOUR (NORMAL EXCHANGE)

| Hour | Per cent Busy-hour Traffic |
|---|---|
| 12:00— 7:00 | * |
| 7:00— 8:00 | 40 |
| 8:00— 9:00 | 70 |
| 9:00—10:00 | 95 |
| 10:00—11:00 | 100 |
| 11:00—12:00 | 80 |
| 12:00— 1:00 | 50 |
| 1:00— 2:00 | 75 |
| 2:00— 3:00 | 100 |
| 3:00— 4:00 | 90 |
| 4:00— 5:00 | 90 |
| 5:00— 6:00 | 90 |
| 6:00— 7:00 | 60 |
| 7:00— 8:00 | 50 |
| 8:00— 9:00 | 40 |
| 9:00—10:00 | 40 |
| 10:00—11:00 | 25 |
| 11:00—12:00 | 25 |

*No estimate is given for 12:00 to 7:00 a.m. as traffic is very light during this period.

### Traffic Load Estimating

When an existing manual service is not entirely satisfactory because of overloaded party lines, poor transmission, or for any intangible reason, the traffic measurements fall short of providing acceptable data for estimating the needs of a proposed conversion to an automatic office but even so, the traffic engineer will have to develop unit calls (CCS) per line in order that he may provide the proper equipment and trunk requirements for the new automatic office.

However, when the manual service is not too bad, the number and distribution of subscribers is not radically changed in the new system and inter-office trunking will not be too severely altered. The comparatively little time spent gathering traffic data will be worthwhile many times over, because the proposed automatic system will be economically designed and subscribers' satisfaction will be assured.

Where existing manual service is not good, or where there is no existing telephone service at all, some sort of estimating will have to be made by the traffic engineer to ascertain the CCS load per line and the number of inter-office that should be provided.

For the purpose of determining CCS when there is no traffic available, the following table can be used as approximately correct:

| Class of Service | CCS Per Station |
|---|---|
| 1-party residence | 1.0 |
| 1-party business | 1.5 |
| 2-party residence | .8 |
| 2-party business | 1.2 |
| 4-party station | .6 |
| 8-party station | .4—.5 |
| Paystation | 1.5 |
| PBX trunk | 4.0 |

Inter-office trunk group sizes are arrived at by estimating the traffic load which will be developed in these trunk groups and relating it to the grade of service criteria that has been established for the office. Where two-way service is to be furnished, it will be necessary to consider the total traffic in both directions. The incoming and outgoing traffic (busy hour) can be counted on to vary from .05 to .25 CCS per subscriber for toll tributary carrying no extended area service. When the trunks do carry extended area traffic, from .20 to .50 CCS calls from each subscriber can be expected.

The calling rates given in the above table are subject to revaluation in different exchange areas. Should the calling rate offices in a similar area be known, the above figure should be modified to meet with those developed by experience.

### SWITCH TRAFFIC PER CONTACT

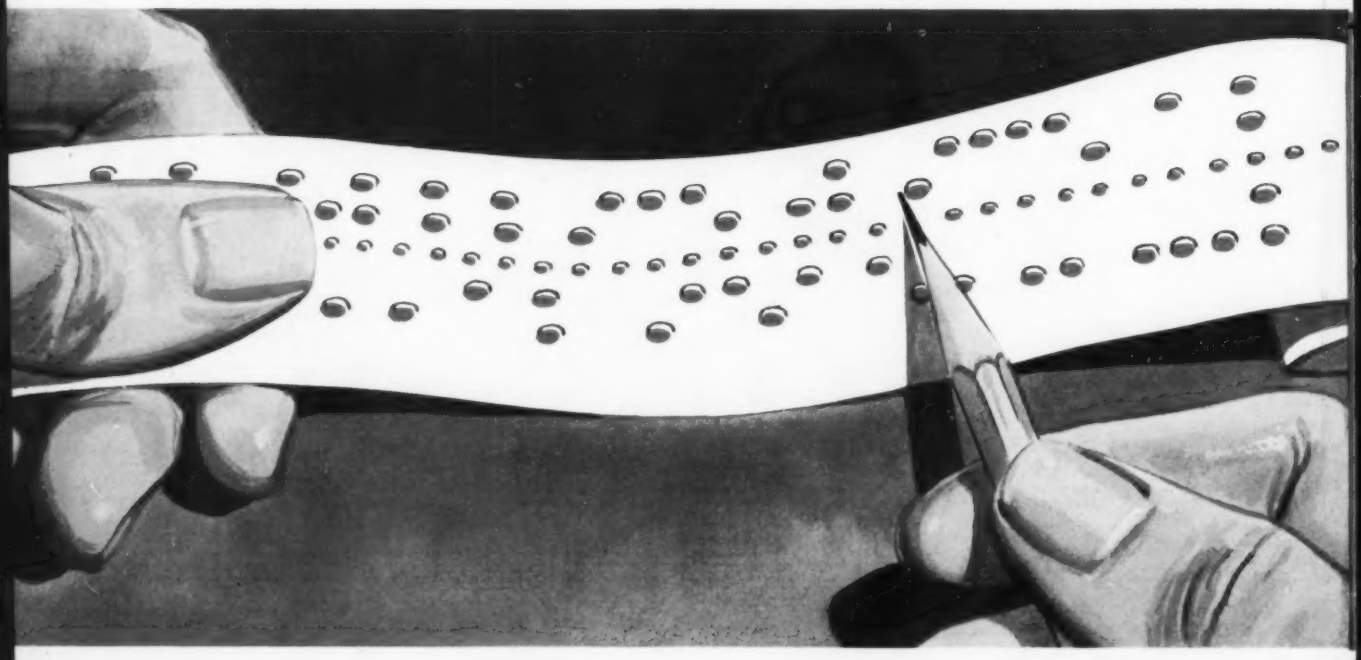
| Bank Contact | CCS Load Carried by Each Contact | % Load Carried by Each Contact | Time Contact Is Busy |
|---|---|---|---|
| 1 | 29 | 19.5 | 80.6 |
| 2 | 27 | 18.1 | 75.0 |
| 3 | 24.2 | 16.2 | 67.2 |
| 4 | 20.8 | 14.0 | 57.8 |
| 5 | 16.8 | 11.3 | 46.7 |
| 6 | 12.6 | 8.5 | 35.0 |
| 7 | 8.7 | 5.8 | 24.2 |
| 8 | 5.4 | 3.6 | 15.0 |
| 9 | 3.0 | 2.0 | 8.3 |
| 10 | 1.5 | 1.0 | 4.2 |
| | 149 | 100 | |

### Distribution of Holding Time (PBX)

The table that follows shows the average basic traffic data for a typical PBX. Where the percentage distribution of traffic in the busy hour is not known, the averages shown below may be used as approximate, with allowances to care for specific cases. By applying the percentages to the total busy hour calls, the number of calls of each class is obtained. If the total busy hour traffic data is not available, it may be estimated from the total outgoing central office calls as obtained from the subscriber monthly usage records. For this purpose, the average of two to three high months,

*(Please turn to page 42)*

# ONLY STROWGER AUTOMATIC GIVES YOU



**Over 10%** of the Independent dial telephones in the United States are served by Strowger Automatic Toll Ticketing. Introduced in 1948, SATT quickly gained acceptance among Independent Telephone companies as the ideal method of handling toll calls swiftly, without an operator. Check these advantages. See how you, too, can increase toll revenue and reduce operating costs with SATT:

- Ticketer spills complete data for each call into pool equipment instantly upon completion of the call. It's always ready for the next call—never choked by data from previous calls.
- Incomplete calls are not recorded. SATT throws out uncompleted calls before the tape is made!
- Call data is recorded on four-channel tape. This permits high-speed, low-cost machine billing.
- Complete call data for each call is recorded on tape, quickly and permanently.
- Ample self-checking and supervisory facilities insure accurate ticketing.
- Flexible design provides for future expansion.
- With SATT, you're ready for nation-wide, direct distance dialing.

# TOLL TICKETING

## THESE THREE FEATURES...

1. Idle ticketer is always ready to handle next call!
2. Throws out incomplete calls before tape is made!
3. Four-channel tape call data permits faster billing!

SATT systems are very flexible. For example, calling-party identification may be handled: (1) automatically—even on party lines, (2) by calling-party dialing, (3) by operator keying, (4) automatically on some lines, operator keying on others. Other features, too, can be varied and combined to meet your special needs.

**Ask your A. E. salesman for complete details**

He'll be glad to tell you more about automatic toll ticketing. Let him show you how you can increase revenue and reduce operating costs with SATT. Write: *Automatic Electric Sales Corporation, Northlake, Illinois. Or call Fillmore 5-7111.*

**AUTOMATIC ELECTRIC**

A member of the General Telephone System—One of America's great communications systems

GENERAL SYSTEM

# TELEPHONY'S Traffic Engineering Handbook

modified by the number of working days per month and the percentage busy hour of the day should be used. Dividing the outgoing central office trunk traffic by the percentage outgoing trunk gives an approximate of total traffic handled by the PBX.

| Class of Traffic | Average % Distribution | Average Holding Time |
|---|---|---|
| Extension to extension | 26 | 70″— 90″ |
| Extension to tie line | 3 | 120″—140″ |
| Extension to C. O. Trunk | 29 | 140″—160″ |
| Extension to toll | 2 | 180″—240″ |
| Extension to Attendant | 3 | 20″— 40″ |
| Total Originating | 63 | 100″—125″ |
| C. O. Trunk to extension | 32 | 140″—160″ |
| Tie line to extension | 3 | 120″—140″ |
| Attendant to extension | 2 | 20″— 30″ |
| Total Originating-Incoming | 100 | |
| Average call | | 130″ |

BELL STANDARDS FOR RINGING AND SILENT PERIODS

| | *Ringing* | *Silent* |
|---|---|---|
| One-ring signal | 2 seconds | 4 seconds |
| Two-ring signal | 1 second | 1 second |
| | 1 second | 3 seconds |

**Crossbar**

The marker holding time for establishing dial tone connection is .4 seconds.

The over-all time from removal of receiver to receipt of dial tone is about .6 seconds minimum.

**Maintenance Items to Look for On Switchboard**

(1) Is the operator's set adjusted properly—mouth piece one-half inch from lips and at right angle?

(2) Does the headset have worn, frayed or noisy cord? Is receiver cracked or broken? Is transmitter noisy or adjustment tension too weak?

(3) Are designation cards legible and in proper place? Are transparent windows clear and in good condition?

(4) Are any lamp caps missing, broken or dirty?

(5) Are signal plugs in all switchboard jacks in service?

(6) Are supervisory lamps so dim as to cause difficulty in being sure of signals?

(7) Do trunk jacks cut out? Test by moving plug to each side and vertically while listening on line.

(8) Do talking keys cut out? Test by moving key from side to side while listening on cord pair under test.

(9) Do keys work smoothly? Are any hard to operate? Does any ringing key "stick?" Do any listening keys "fly back" when operated? Are any key handles loose, broken or missing? Are any key plates cracked or broken?

(10) Is keyshelf so rough there is a danger of operator getting splinters in her hands? Is it unsightly enough to need refinishing?

(11) Are any cords worn, frayed, tangled, too short or noisy?

(12) Are plugs corroded or dirty? Are they worn badly enough to cut out? Are any of them bent? Do any of them have broken bushes?

(13) Are plug seats so worn the plug "sticks" or drops too low in plug rail?

(14) Are alarm switches operative?

(15) Does operator have flowers or any receptacle containing liquids anywhere on the switchboard? Does operator drink cokes or any beverages while at the switchboard?

(16) Is switchboard clean and free of cards, memos or bulletins pasted to it?

(17) Does operator have any comments on the service irregularities or any equipment in need of attention?

(18) When dialing, does operator use eraser end of ordinary pencil instead of dialing tool or pencil?

(19) Does operator have a ready reference record of frequently called out-of-town telephone numbers?

(20) Does operator have the most efficient reference records of classified information and frequently called numbers? Are such records kept up to date, in good order and are they easily accessible?

*(Section 11 will be continued next week)*

## Col. W. C. Henry Named Executive Reservist

The Office of Defense Mobilization in Washington, D. C., has announced the appointment of Col. W. C. Henry, president and general manager of the Northern Ohio Telephone Co. of Bellevue, O., as an executive reservist. Colonel Henry together with selected business executives in various lines of business and industry will take part in government mobilization exercises twice each year and will be subject to call to duty in Washington to assist the federal government in the event of a national emergency.

Colonel Henry, who served as communications officer on the staff of General Eisenhower's Supreme Headquarters Allied Expeditionary Forces in Europe during World War II, has been assigned to the Telecommunications Section which will have over-all responsibility for all forms of civilian communication should an emergency arise.

## Mo. ITPA Member Injured, Wife Killed In Auto Crash

William Ricks of Pleasant Hill, Mo., a lineman for the United Telephone Co. of Missouri was seriously injured on Feb. 16 and his wife killed in an automobile accident near Passaic, Mo.

A couple in the car that ran into the Ricks' car was killed and their daughter seriously injured.

Mr. Ricks is suffering from a fracture of both legs as well as many cuts and bruises.

Both he and his late wife were members of the Theodore Gary chapter of the Independent Telephone Pioneer Association.

## Name Nev. Exchange Manager

Joseph W. Boyer has been named manager of the Elko (Nev.) exchange of the California-Pacific Utilities Co. of San Francisco, Cal., it was reported on Feb. 7. Mr. Boyer succeeds R. E. Pilloud, who is retiring. The appointment was announced by E. K. Albert, California-Pacific president.

# Courts and Commissions

## Ohio Bell Seeks Statewide Increase In Rates

The Ohio Bell Telephone Co. on Feb. 3 filed a petition with the Ohio Public Utilities Commission for a rate increase giving the company an increase in annual revenues of $28,334,000.

The increase is being asked, the company said, to cover higher costs for materials, taxes, and wages. The company said that it has spent 560 million dollars since 1940 in an expansion program.

Current rates allow Ohio Bell a return of less than 4½ per cent on its investment and the company plans another 250-million-dollar expansion program in the next three years.

## Neb. Court Reverses Increase Earmarked Solely For Wages

The Nebraska Supreme Court on February 7 reversed an order of the Nebraska Railway Commission granting a rate increase to the Skeedee Independent Telephone Co. of St. Edward. The court called the order "unauthorized, unreasonable and arbitrary."

The commission's order had authorized part of an increase in rates sought by the Skeedee company, and stipulated that the increase of $2,539 annually be used to pay higher wages for employes. Earlier, the commission had denied an increase in rates (TELEPHONY, Sept. 21, 1957, p. 35).

The supreme court ordered the commission to reconsider the case, stating that the order "invaded the province of management" and was in effect "an order fixing wage scales at the proposed rates set out in the applicant's evidence as a foundation for its need of additional revenue."

"We have been cited to no authority (and find none) which authorizes the commission to fix wage scales or direct expenditures of funds for a particular purpose," the court opinion stated.

It also said that the effect of the order was to find "that there was no need for more revenue so that the applicant could meet the needs of its property for maintenance, betterments, and extension of service; that there was no need for more revenue to meet the applicant's fixed charges such as taxes and interest; and that there was no need for more revenue to meet the payment of an adequate fair return to its stockholders."

The court decision went on to say that "the evidence as to need for increased rates in these three areas is just as clear and convincing as it is in the area of need in wage and salary increases."

The commission violated its own rules for conducting such proceedings, the supreme court said.

## General Telephone Gets Raises For 4 Tex. Exchanges

Four Texas exchanges of the General Telephone Co. of the Southwest were granted rate increases during January. They are:

| | *Old* | *New* |
|---|---|---|
| *Gonzales* (C.B.) | | |
| One-party business | $ 8.00 | $ 9.35 |
| Two-party business | 6.50 | 7.50 |
| One-party residence | 4.25 | 5.00 |
| Two-party residence | 3.75 | 4.50 |
| *Sulphur Springs* (Automatic) | | |
| One-party business | 9.00 | 10.50 |
| Two-party business | 8.00 | 8.75 |
| One-party residence | 4.25 | 5.25 |
| Two-party residence | 3.75 | 4.45 |
| Four-party residence | 3.25 | 3.90 |
| *Clarksville* (C.B.) | | |
| One-party business | 10.00 | 11.00 |
| Two-party business | 8.00 | 9.00 |
| One-party residence | 5.00 | 5.50 |
| Two-party residence | 4.00 | 4.50 |
| Four-party residence | 3.25 | 3.75 |
| *Lamesa* (Automatic-EAS) | | |
| One-party business | 9.50 | 11.00 |
| Two-party business | 7.75 | 8.25 |
| One-party residence | 5.00 | 5.10 |
| Two-party residence | 4.50 | 4.60 |
| Four-party residence | 3.85 | 3.95 |

## Florida Commission Issues Telephone Statistics, Rates

A study of "Telephone Statistics and Local Exchange Rates" for the Florida telephone companies has just been compiled by the Florida Railroad & Public Utilities Commission.

P. M. Schuchart, director of the Florida commission's engineering department, on Feb. 19 stated, in describing the study, that this compilation gives the name of every exchange in the state of Florida by companies, the number of stations in service as of Dec. 31, 1957 and the local exchange base rates. He added:

"It is interesting to note that of the 191 exchanges operated by the various companies, 93 per cent are automatic and 7 per cent are common battery manual. Of the 1,499,888 stations, 97 per cent of them are dial and 3 per cent are manual.

"Seven of the manual exchanges are Southern Bell. Three of them are scheduled to be converted to automatic in 1958, two of them in 1959, one in 1960, and there are no plans for the conversion of the remaining exchange, Havana.

"Of the seven exchanges in Independent territory, five of them are scheduled for conversion to automatic in 1958; for the two remaining ones, Blountstown and Chattahoochee, no schedule for conversion to automatic has been announced."

## OK Neb. Exchanges Raise For Kan. Independent

On January 28 the Nebraska Railway Commission approved a schedule of rates for the American Communication Co. of Belleville, Kan., applying to its Nebraska exchanges at Chester, Hubbell, Reynolds and Byron. The new rates, which become effective with conversion of these exchanges to automatic operation, are as follows:

| | *Bus.* | *Res.* |
|---|---|---|
| One-party | $7.25 | $4.75 |
| Two-party | 6.50 | 4.25 |
| Four-party | | 3.75 |
| Rural | 6.00 | 4.00 |
| Color telephone | .25 | .25 |

The local call rate from public paystations was established at 10 cents. Extended area service will be discontinued.

## Commission Expert Fund Bill Defeated In W. Va.

A bill which would have given the West Virginia Public Service Commission $150,000 in additional funds annually, to be used for hiring professional personnel for rate case inves-

tigations, was defeated in the state senate finance committee.

Senator Glenn Jackson, committee chairman, said that most members of the committee believed that all functions of the commission should be thoroughly studied before the agency is given more money.

## OK 6 Million Dollar Raise For C&P of Maryland

The Maryland Public Service Commission on Feb. 11 authorized the Chesapeake & Potomac Telephone Co. to raise its charges by $6,048,900 annually (TELEPHONY, Dec. 14, p. 46).

The increase was 70 per cent of that requested by the company. The rate increases will net the company $2,806,727 after taxes, bringing the return on investment to 6¼ per cent.

## Authorize Bond Issue By Neb. Independent

The Lincoln Telephone & Telegraph Co. was authorized by the Nebraska Railway Commission on February 6 to issue and sell five million dollars worth of first mortgage 4⅞ per cent bonds due February 1, 1988.

The company stated that funds will be used for refunding bank loans and for the 1958 construction program.

## Order Refund of Paystation Revenue to County, State

Louisiana District Judge C. Caldwell Herget on Feb. 13 ordered Southern Bell Telephone & Telegraph Co. to turn over paystation refunds for a period from Oct. 1, 1956 to April 1, 1957 to the parish of Orleans and to the state of Louisiana (TELEPHONY, Feb. 8, p. 28).

The refunds were originally ordered by the Louisiana Public Service Commission in 1956 when Southern Bell was directed to cut long distance rates 20 per cent and to reduce 10-cent paystation calls to a nickel. An appeal of the commission's order to the courts was refused last year.

Judge Herget ordered Southern Bell to turn over $465,477 to the public administrator of Orleans parish and $473,954 to the state revenue collector.

The money represents the unclaimed balance of paystation tolls collected during the period the disputed rates were in effect under bond.

## OK Sale of Minn. Independent

The Minnesota Railroad & Warehouse Commission on Feb. 6 approved the sale of the Kalevala Cooperative Telephone Association, Kettle River, to the Pineland Telephone Co., McGregor.

## Appeal N. J. Bell Raise To Superior Court

A decision by the New Jersey Public Utility Commission granting rate increases to the New Jersey Bell Telephone Co. (TELEPHONY, Jan. 11, p. 52) was appealed on Feb. 13 by the state attorney general to the superior court.

The increases ranged from 7 per cent for home service to 1 per cent for business use. They were intended to raise the company's gross revenues by 11.5 million dollars yearly. The state asked that the increases either be eliminated or drastically reduced.

It is reported that this appeal is the first of its kind under a 1950 opinion by the late Chief Justice Arthur T. Vanderbilt of the state supreme court. Chief Justice Vanderbilt held that the attorney general's office could provoke such an appeal as a "defender of the public interest."

Another telephone rate appeal was filed on Feb. 13 in the superior court's appellate division, by Joseph M. Nolan, Newark, N. J. counsel for 30 foreign exchange subscribers in New Jersey Bell's Verona-Cedar Grove Area. The telephones of these subscribers are connected with the company's Montclair exchange.

A temporary reduction in the company's $7.50 foreign exchange rate to $1.90 had been ordered on Jan. 23 by Public Utility Commissioner Ralph L. Fusco. The $7.50 rate was established by the commission on Dec. 30, at which time the company also was permitted to charge a wire mileage rate of $1.50 for each quarter-mile.

The old wire mileage rates were $1.00 a quarter-mile for one-party service; 60 cents for two-party, and 40 cents for four-party and rural service.

At the Jan. 23 hearing, following protests about the charges, the commission in addition to temporarily reducing the foreign exchange rate also lowered the wire mileage charges from $1.50 to 25 per cent above the old rates listed above.

The question of whether the commission has the right to proceed with the rehearing of New Jersey Bell's rate increase case in the face of two appeal notices filed in the appellate division of the Superior Court was raised on Feb. 13 before the commission.

Commissioner Fusco directed counsel for all interested parties to file briefs by Mar. 3, indicating legal authority on whether the commission has jurisdiction to continue the hearing on foreign exchange service charges while the two appeal notices are pending.

Commissioner Fusco on Jan. 23 also directed New Jersey Bell to restore foreign exchange service to persons who had changed to local service, should they request it.

Duane E. Minard Jr., New Jersey Bell attorney, estimated it would cost the company between $50,000 and $60,000 to reinstall the service to those who had changed to local service since Jan. 1.

## Ordered to Make Refund In Delaware Despite Appeal

The Diamond State Telephone Co. has been ordered to start making refunds to customers, despite its decision to appeal part of the Delaware Public Service Commission's ruling on rate increases, it was reported on Feb. 12.

The commission said the company has been ordered to refund about $300,000.

Diamond State informed the commission on Feb. 11 that it will appeal to Superior Court four points involved in the commission's Jan. 15 decision, which granted only 59.1 per cent of the increases the company sought and had been collecting under bond, since last July (TELEPHONY, July 27, p. 42).

The company is accepting the bulk of the commission's ruling, but seeks to overturn sections of it and thus reduce the amount it must refund.

The company originally sought a rate increase which would bring it added gross revenue of $1,880,000 a year. Last July it tentatively put into effect, as permitted by law, new rates designed to increase its revenue by that amount.

Then on Jan. 15 the commission knocked out $778,334 of that amount by deciding the company was entitled to a rate increase to bring in only $1,101,666 more a year.

Now the company is appealing four points in the decision involving $268,703 a year in added revenue. Thus, the Feb. 11 action means that the rate increase finally to be allowed the company will be no higher than $1,370,369 and no lower than $1,101,666, which is the amount the commission ordered last month.

The commission has ordered the company to file a new rate schedule designed to produce the higher of these two figures in added revenue, and to continue its bond in effect to guarantee payment of rebates later on the contested items involving $268,703 a year. In the event these items are decided against the company by the courts, a further rebate would be required.

Of the four points to be contested by

*(Please turn to page 48)*

# This Strand Is Armored

. . . armored against attack by rain, snow, sleet, ice, and fume-laden air.

It's Bethlehem strand with the ductile bethanized coating that frustrates corrosion. It's the strand with the long life-expectancy. You can install it with complete confidence, and forget about it for years.

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. *Export Distributor:* Bethlehem Steel Export Corporation

BETHLEHEM STEEL

**BETHLEHEM STEEL**

# Pointing out a telephone sales feature

The gentleman on the right is Mr. Dale J. Bellamah, a progressive home builder in New Mexico. The telephone outlet that he's pointing to is one of several that are in every house he builds.

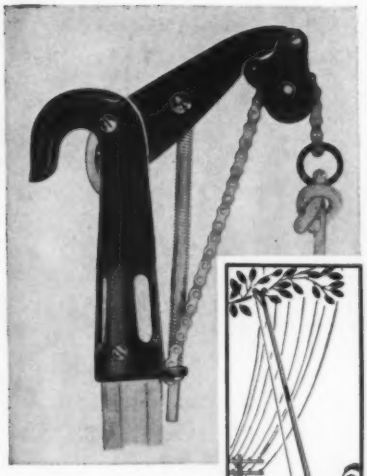
Mr. Bellamah is enthusiastic about concealed telephone wiring, and planned telephone outlets. "If," he says, "you're building modern homes for people with modern ideas, you can't have exposed telephone wiring any more than you can have exposed plumbing!"

Mr. Bellamah is one of many builders appearing in Bell System advertisements addressed to architects and builders in the trade magazines they read. The ads speak of the merits of concealed telephone wiring in terms of what it means to builders—how it makes homes more salable.

As more homes are built with outlets ready and waiting, extension sales go up. Installations are faster and cheaper. Planned outlets help sell homes, and sell more telephones.

**BELL TELEPHONE SYSTEM**

MODERN HOMES HAVE HANDY PHONES



clear
lines
fast with...

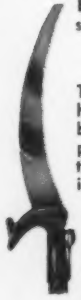
SEYMOUR SMITH
"Telephone" Tree Pruner

Here's the standard, the choice of the utility industry for years. Powerful action to cut cleanly—tough and almost unbreakable—easy to handle. No. 12 Pruner Head has 1½" cutting capacity. The lighter, No. 11, handles up to 1" branches. Both are malleable iron castings with tempered steel cutting blade.

Poles (18 ft. 3 sections) are of selected spruce with positive locking, seamless aluminum, telescoping ferrule joints.

FAST CUTTING PRUNING SAWS

Designed for fast, easy cutting—large, deep teeth, finest Swedish charcoal steel, streamlined, laminated hardwood handles. Every model you need up to chain saw work.



No. 20 POLE SAW HEAD

Tough aluminum head with large hook and outside horn for pushing branches, raising wires, etc. Also paint brush holder with wire clamp that holds brush securely. Fast-cuting 16" blade. Poles available.

FREE: Send for Seymour Smith catalog pages on tools for utilities. Keep them on file for easy reference.

Quality Tools
SEYMOUR SMITH
Since 1850

SEYMOUR SMITH & SON, INC.
4503 Main St., Oakville, Conn.


the company in its appeal, three involve accounting procedures. These three items are an amount for interest charged against construction, an amount for charitable contributions which the commission declined to consider in the rate base, and part of the amount claimed by the company as federal income tax expense. The fourth and largest item being contested is the commission's exclusion of cash working capital from the rate base.

## Authorize Stock Issue For Missouri Company

The Missouri Public Service Commission authorized the Meramec Telephone Co., St. James, to issue 1500 shares of 6¼ per cent cumulative preferred stock with a par value of $100 per share, it was reported on Feb. 20 (TELEPHONY, Feb. 1, p. 45).

Part of the proceeds will be used to retire 510 shares of 5 per cent preferred stock outstanding with a total value of $51,000.

The rest of the money will be used in the conversion to automatic operation of the company's St. James and Cuba exchanges.

## Rate Raise for Illinois Independent OKd

The Illinois Commerce Commission on Feb. 20 authorized rate increases in three cities.

The Hardin County Telephone Co., Rosiclare, was authorized to increase its rates at Rosichare, Elizabethtown and Cave-in-Rock (TELEPHONY, Dec. 14, p. 44). The new rates will increase company revenue $5,000 per year.

## Authorize Sale Of Kansas Independent

The Kansas Corporation Commission on Jan. 28 approved the sale of the Central Kansas Telephone Co., Inc., Cedar Point, to the Reno Telephone Association, Hutchinson.

The Central Kansas Telephone Co. includes the exchanges at Cedar Point, Saffordville, and Walton.

Bert Peterson, Central Kansas president, said this was the first transaction involving sale of an REA-financed company to another REA company.

## Ill. Independent Asks Raise

The Illinois Commerce Commission recently reported that the Madison Telephone Co., Bethalto, has filed a petition for a $4,200 annual rate increase for its subscribers at its Hamel exchange. Expenses for converting Hamel to automatic operation were cited as the reason for the raise.

## Western L&T Sells Okla. Exchanges to Independent

The Oklahoma Corporation Commission recently approved the sale by the Western Light & Telephone Co., Great Bend, Kan., of the company's 15 Oklahoma exchanges to the Pioneer Telephone Cooperative, Inc., Kingfisher.

These exchanges are Canton, Covington, Crescent, Custer City, Garber, Hennessey, Hunter, Kingfisher, Marshall, Okarche, Orlando, Pond Creek, Seiling, Thomas, and Watonga. Approximately 8,200 subscribers are involved.

Pioneer plans to convert all these exchanges to automatic operation. The Pioneer company is currently operating 10 exchanges in Oklahoma, all of which have automatic central offices or are being converted to automatic operation.

Ray C. Boecher, Pioneer manager, said that the rate increase case which Western has had pending will be dropped (TELEPHONY, Mar. 23, 1957, p. 50).

## Neb. OKs Billing Municipal Taxes to Local Subscribers

The Nebraska Railway Commission on Feb. 7 authorized the Lincoln Telephone & Telegraph Co. to "pass on to its subscribers occupation taxes, license taxes, permit fees, franchise fees, etc. imposed upon it by cities, towns or villages.

"Such charges," the commission stated, "would be billed in equal proportion to each subscriber within the corporate limits of the city, town or village imposing the tax or fee." (TELEPHONY, Feb. 15, p. 36).

## Two Kan. Independents Get Temporary Dial Raises

The Kansas Corporation Commission on Feb. 19 authorized two Independent companies to increase rates when three exchanges are converted to dial service.

Northern Kansas Telephone Co., Nortonville, was allowed the temporary dial rates, to be collected under bond, when exchanges at Circleville and Emmett go to dial service.

Assaria Telephone Co. was allowed the dial service rates, also under bond.

## Deny Lincoln T&T EAS Rehearing

The Nebraska Railway Commission on February 4 overruled the motion of the Lincoln Telephone & Telegraph Co. for a rehearing on an order of December 17 directing the company to provide service between Bennet and Lincoln (TELEPHONY, Jan. 25, p. 50).

# QUALITY DEPENDABILITY PERFORMANCE

**EXCHANGE AREA CABLE**

Aerial and Duct are R.E.A. listed. Both Aerial and Duct and Direct Burial Cable utilize polyethylene insulation, aluminum shield and high molecular weight polyethylene jacket for top electrical values. Available in #26, #24, #22, or #19 AWG in 6 through 404 pairs.

**RURAL DISTRIBUTION WIRE— R.E.A. LISTED**

Conductors insulated with high molecular weight polyethylene and jacketed with color coded, weather resistant vinyl provide good transmission values at low cost. Available in either #19 or #22 AWG with 3, 6, 11, or 16 pairs cabled over a high molecular weight polyethylene insulated high strength galvanized support wire.

**URBAN DISTRIBUTION WIRE**

The rugged weather resistant vinyl insulation over the conductors is fully color coded. This construction, designed for block distribution, serves best where low cost rather than low attenuation is the prime consideration. Available in #24 AWG with 6, 11, or 16 pairs.

**ONE PAIR DISTRIBUTION WIRE**

A high molecular weight, weather resistant polyethylene extrusion encompasses the parallel conductors. A raised ridge tracer provides polarity identification. The high strength conductors make possible long spans on lateral branches or drop runs. Available in #14 or #12 Copperweld or .083 galvanized steel.

**INSIDE WIRING CABLE**

Solid, soft drawn bare copper conductors fully color coded with heat resistant polyvinylchloride insulation. All pairs twisted with varying lays to minimize cross talk and cabled to insure maximum flexibility. A tough, water resistant vinyl jacket in either brown or ivory provides good conductor protection for exposed insulation. Rip cord construction prevents damage to conductors in stripping. Available in #24 AWG with 6, 12, 16, 21, 26, 51 or 76 pairs.

# REX WIRES & CABLES

*SEND TODAY FOR THIS CATALOG — CONTAINS COMPLETE DATA AND SPECIFICATIONS FOR ALL REX WIRES AND CABLES.*

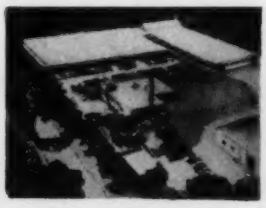
INDEPENDENT

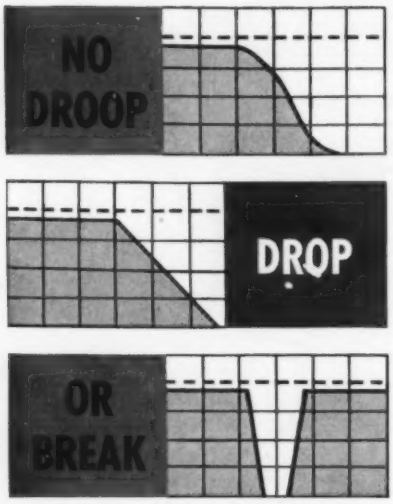
*Manufactured by*

REX WIRE & CABLE

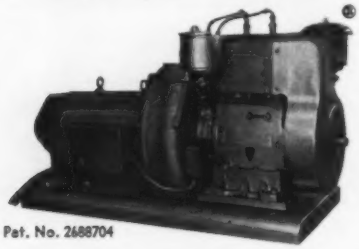
**THE REX CORPORATION**

**100 HAYWARD ROAD, WEST ACTON, MASS.**






**in Communications with U. S. MICRO-POWER**



Pat. No. 2688704

***Your Insurance Policy for . . .***

***Stable Continuous Uninterrupted***

**Communications Power**

Micro-Power operates *with* the main source of power. No time consuming "load transfers." No "power outages" *even for precious seconds!*

Micro-Power Units are available in 1500, 3000, 5000 and 10000 watt capacities. For complete information, specifications, and demonstration, write . . .

UNITED STATES MOTORS CORPORATION
LIGHT US POWER
OSHKOSH · WISCONSIN

**U. S. MOTORS CORP.**
102 W. 5th Avenue
OSHKOSH, WISCONSIN


## Fred Twigg, Michigan Secretary, Dies in Crash

Fredrick B. Twigg, 62, executive secretary of the Michigan Independent Telephone Association, was killed instantly in an auto crash on Feb. 18 in which his daughter Mitte, 21, was also killed and his wife, Mary, injured.

Mr. Twigg and his family were on their way back to their home in Eaton Rapids, Mich. after a weekend trip to Port Hope, Mich. to visit the family of Miss Twigg's fiancee. The accident

F. B. TWIGG

occurred about 5 miles west of Harbor Beach when according to state officials Mr. Twigg apparently pulled into the lefthand lane to avoid a snowdrift but failed to see an approaching ice cream truck. Blowing snow made the visibility poor, police said. The two vehicles crashed head-on.

A veteran of 28 years in the telephone industry, Mr. Twigg was born in Chicago. He attended school there taking night courses in electrical engineering at Northwestern University after graduation from high school.

From 1916 to 1919 Mr. Twigg served as an assistant post supply officer and as assistant post adjutant in the U. S. Air Service. Coming out of the military, he went to work in administration and production for Solvay Process and Sement Solvay Companies in Detroit.

His telephone career began in 1924 when he left Solvay to work for the Illinois Bell Telephone Co. He was a division commercial supervisor at the time of his resignation in 1936.

In that year he became personal consultant to small telephone and electric companies in the Midwest and remained in that position till 1943 when he accepted a position as an engineer for E. I DuPont. He worked at their Wabash River Ordinance in Terre Haute, Ind., Gopher Ordinance in Rosemount, Minn., and Hanford (Wash.) Engineering Works.

Leaving DuPont in 1947, he became plant superintendent at the Research Center of the University of Minnesota in Rosemount, Minn.

From 1949 until his death, Mr. Twigg was executive secretary of the Michigan Independent Telephone Association.

## D. C. Power Elected to Industrial Conference Board

Donald C. Power, president of General Telephone Corp., on Feb. 20 was elected a board member of the National Industrial Conference Board.

On the same date, Fred M. Farwell, executive vice president of International Telephone & Telegraph Corp., was re-elected a board member.

The Conference Board, founded in 1916, is an independent and nonprofit institution for business and industrial fact-finding through scientific research. In terms of everyday usefulness, the Board is a source of facts and figures bearing on all aspects of economic life and business operation.

The work of the Board is made possible through the support of more than 3,600 subscribing associates including business organizations, trade associations, government bureaus, labor unions, libraries, individuals, and colleges and universities.

## Highway Relocation Bill Pending in New York

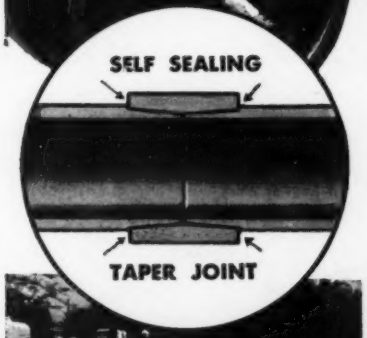
A bill which would require the state to reimburse public utilities for the cost of moving their facilities when necessitated by federal-aid highway construction was reported pending on Feb. 17 in the New York State Legislature.

Governor Harriman last year vetoed a similar measure (TELEPHONY, May 11, p. 43).

## Georgia Reimbursement Bill

Proposed legislation to require the state to reimburse public utilities for the cost of moving their facilities when necessitated by interstate highway construction was opposed by the Georgia Association of County Commissioners and the Georgia Oil Jobbers Association at a hearing conducted on Feb. 11 by a committee of the Georgia House of Representatives.

# SMOOTH BORE!



## Orangeburg Fibre Conduit Prolongs Cable Life

Protect cable sheath from abrasion and you prolong the life of underground cables, say utility engineers. Scoring of cable sheath creates "trouble spots" that shorten cable life.

That's where Orangeburg Fibre Conduit plays an important part in keeping cables healthy. Orangeburg's smooth bore, its low coefficient of friction minimize the danger of abrasion when cables are pulled in, as well as later on during cable movement. By protecting cable sheath from abrasion, Orangeburg Fibre Conduit adds years to cable life.

Orangeburg's impermeable wall and watertight joints protect cables from corrosive ground waters. Its nonmetallic material is strong, tough, resilient, long lasting.

And, remember, Orangeburg lays faster and at lower cost than other types of conduit. It is light in weight, easy to handle, easy to tool on the job. Spacers, bends, fittings, 5° bend sections and lightweight tapering tool, all combine to simplify installation.

Since 1893, records of long life have proved Orangeburg's durability and economy.

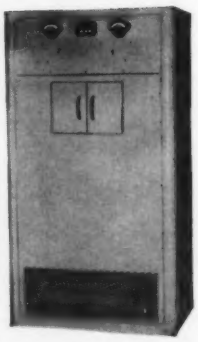
Orangeburg Fibre Conduit is distributed by Graybar Electric Company and General Electric Supply Company with branches and stocks in principal cities.

WRITE DEPT. T-38 FOR NEW CATALOG 52.

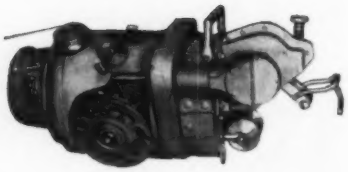
ORANGEBURG MANUFACTURING CO., INC., Orangeburg, N. Y. West Coast Plant, Newark, Calif.

**ORANGEBURG®**
***FIBRE CONDUIT***

**New 48-Volt Battery Charger Line.** Completely redesigned Raytheon Recti-Chargers (R) feature no load to full load regulation of ±1%, no tubes, automatic compensation for rectifier aging, no audible hum. Most compact units on the market—single and three phase, output from 3 to 400 amperes. RAYTHEON MANUFACTURING COMPANY.

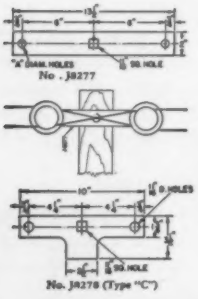


**Self-Contained Unit**—The 3-phase Flotrol Automatic Constant Voltage Battery Charger has no moving parts—all components in one cabinet. No separate units to install. Designed for plants requiring 25 to 400 amps charging capacity.
LORAIN PRODUCTS CORPORATION.



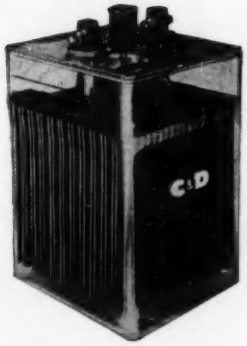
**For the Placement and Spinning of New Cable**—The Neale Model D Pull Type Spinner also used for maintenance spinning of existing cable. Offers instant adjustment to all size cable—from minimum to maximum diameter of 2¼". CABLE SPINNING EQUIPMENT COMPANY.

**Simple and Effective!** The quick, easy, positive way to dry splices in lead-covered cable is to sprinkle Drierite Dessicant granules in among the conductors. This W. A. HAMMOND DRIERITE COMPANY product will not harm the sheath, conductors, or insulation.




**Joslyn Tandem Transposition Brackets**—Joslyn J8277 and J8278 hot dip, galvanized Transposition Brackets used with No. H56 glass transposition insulators. The J8278 has a protruding supporting section for use on angles in the line. Insulator pins, glass insulators, and ⅝-inch bolts for mounting to the crossarm should be ordered separately.
JOSLYN MFG. & SUPPLY COMPANY.

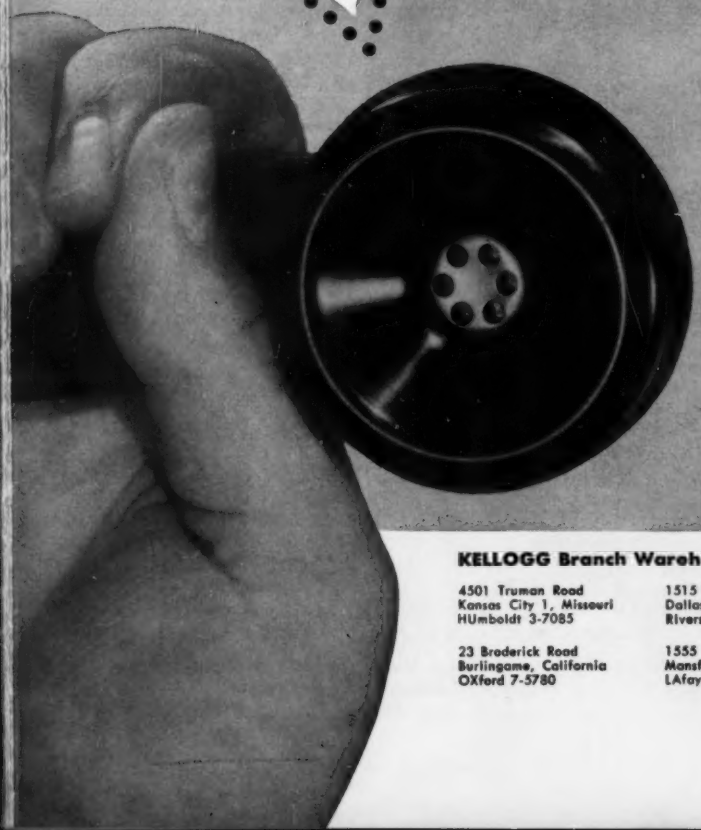
**The Cook Hy-Cap Power-cross Protector** is designed for use where there is a possibility of contact between communication circuits and power circuits. It also will furnish considerable protection from lightning damage. A product of COOK ELECTRIC COMPANY.




**Extra-Long Life!**—The suspended and supported plate construction is an exclusive feature of C&D BATTERIES. Choose C&D PlastiCal (lead-calcium grid) for life expectancy of 25 years . . . for 14 years expectancy, specify PlastiCell (high tensile lead alloy grids). Made by C&D BATTERIES, INC.

**Save Three Ways** . . . on materials, manhours, and maintenance with INDIANA STEEL & WIRE CO.'s Crapo HTL-85 and HTL-135 Line Wire. Galvanized by the famous Crapo Galvanizing Process, protected with heavy ductile coating of zinc.

## WE HAVE IT IN STOCK AND WE'LL SHIP IT TODAY



"We have it in stock and we'll ship it today." That's the answer that sounds so good when you need line supplies badly. And that's the answer you expect when you call Kellogg for emergency service. Kellogg has the largest inventory of telephone line supplies available . . . and Kellogg trained personnel are ready to give you fast service when you need it.

**KELLOGG**

KELLOGG A DIVISION OF IT&T

**KELLOGG SWITCHBOARD AND SUPPLY COMPANY**
A Division of International Telephone and Telegraph Corporation
Sales Offices: 6650 S. Cicero Ave., Chicago 38, Ill.

**KELLOGG Branch Warehouses and Offices:**

4501 Truman Road
Kansas City 1, Missouri
HUmboldt 3-7085

1515 Turtle Creek Blvd.
Dallas 7, Texas
Riverside 7-5191

1594 Southland Circle, N.W.
Atlanta, Georgia
Sycamore 4-2441

5924 S. Pulaski Road
Chicago 29, Illinois
REliance 5-7740

23 Broderick Road
Burlingame, California
OXford 7-5780

1555 West Fourth Street
Mansfield, Ohio
LAfayette 4-6511

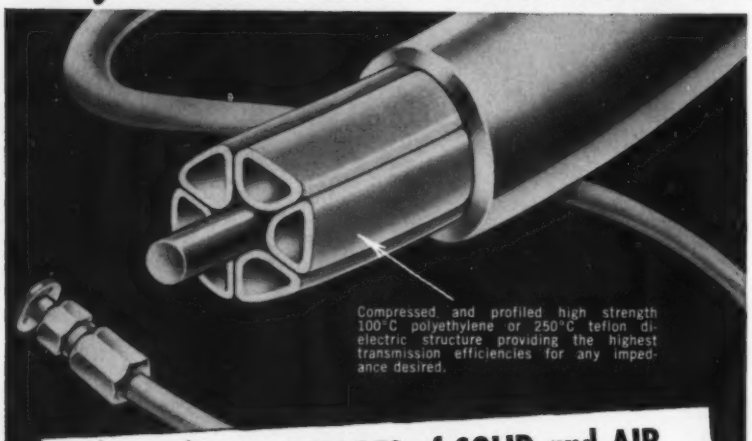
165 Prospect Street
Passaic, New Jersey
Prescott 9-3610

6100 Excelsior Blvd.
Minneapolis 16, Minnesota
WEst 9-6715-16

NEW All-American!

# Spir-O-line®

## SEMI-FLEXIBLE ALUMINUM TRANSMISSION LINE

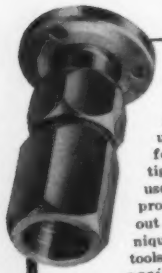

Compressed and profiled high strength 100°C polyethylene or 250°C teflon dielectric structure providing the highest transmission efficiencies for any impedance desired.

## UNIQUE! ADVANTAGES of SOLID and AIR DIELECTRIC LINE COMBINED by Prodelin in revolutionary Cable and All-Aluminum Connector

Here's another Prodelin-pioneered contribution to air-dielectric transmission lines . . . *Spir-O-line.** It combines the low loss of air dielectric with the high power of solid dielectric lines by using dielectric tubes compressed and profiled into a symmetrical supporting structure. 50 ohm lines available in continuous lengths up to 1000' with reliably low VSWR and usable up to these cut-off frequencies: ⅜" to 15.0 Kmc; ½" to 10.0 Kmc; ⅞" to 5.0 Kmc; 1⅝" to 2.8 Kmc; 3⅛" to 1.5 Kmc.

FEATURES

- No special techniques or tools required to make up cable-connector assembly
- No metallic welds or dielectric splices are used regardless of cable length
- Continuous high-conductivity aluminum sheath assures maximum pressure tightness and weather protection
- Uniform straight lay tubular support throughout keeps inner conductor smoothly centered on beads
- Pressure-tight and high tensile cable-connector assembly can be made with only hand-tightening
- Dielectric structure makes continuous and intimate line contact with both conductors without spiraling — yielding best broadband performance, highest power handling capacity, lowest attenuations, and VSWR smoothness
- Both cable and connector available for −90°C to +250°C operation
- Terminates in standard EIA (RETMA) dimensions



PLUS

**Spir-O-line Connector**

Amazing Prodelin development! Adequately pressure-tight for lab use when hand-tightened . . . ready for field service when wrench-tightened. Specifically designed for use with soft aluminum tubing to provide highest tensile strengths without tube distortion. No special techniques, bulky fixtures, or non-standard tools required. *May be used again and again without redressing tubing or replacing connector parts!* Saves time and money! RETMA dimensioned.

Specify Spir-O-line HI-TEMP with Teflon for 250°C operation

ANTENNAS and TRANSMISSION LINES
Prodelin Inc
KEARNY, NEW JERSEY, U.S.A.

Reconsider your cable requirements now and ask how Spir-O-line can provide new life with added economies in your service! WRITE FOR TECHNICAL BULLETIN TODAY

DEPT. T-3, 307 BERGEN AVE., KEARNY, N. J.

*PATENTS PENDING

**Spir-O-line! — the only All-American Semi-Flex Aluminum Cable and Connector Conceived, Engineered, and Manufactured in the U. S.!**

# BASIC RESEARCH

*Continued from page 23*

limited and circumscribed our effort. We have done a great deal, and I am only stating the fact when I say that this has opened up prospects for the future of communications that are beyond all calculation. Nevertheless I think we would have done more, and be somewhat further into the future than we are today, if the conditions imposed on us had been less stringent.

### *Big Business and Research*

Finally, let me address a few remarks to those people both in and out of public office who for reasons best known to themselves seem dedicated to the effort to harass and attack big business, and to cut it down to some other size of their own choosing.

I ask them to stop, look, and listen. A few minutes ago I was saying that the cost of basic research is nothing for a big business to be scared of. However I didn't say it was free. It is in fact big enough to require big resources. For one thing, the research group needs to be large enough for its members to spark each other, and to attract the top-notch people who want to work in a scientific community that draws others of equal caliber.

So if basic research within industry is really going to grow, it is going to have to grow in big organizations. I don't mean there isn't room for it in smaller ones, especially when they are doing work for the government and the cost gets paid that way. But if industry as a whole is going to get up a full head of steam in acquiring new knowledge, the impetus has got to come from big business which has the means to pay for it.

How can those who continually attack big business expect us to accept this new kind of risk if they keep us forever preoccupied with the effort to keep ourselves whole? This is simply not the way to get on with the vital tasks that we must get on with.

So I say sincerely and urgently to those in public life: By all means, hold us in big business to our responsibilities. But give us, also, the freedom to build the strength that we need to meet them.

The next generation—and the time may be shorter than that—will surely be decisive in the future of our country and the world. Let it never be said in years to come that we failed because this man had a pet theory, and that man was thinking of votes.

I hope I have made myself plain. I have said to you tonight that we in

the Bell System have found basic research essential to progress in one very important field.

I have urged others in business to take note of the threat we all face and to accept whatever responsibility properly belongs with them in their fields.

I have reminded members of government, finally, of their responsibility to allow us in business the freedom and the resources we need to do our job.

For the stakes are high and they concern not any single group, but the welfare of the nation and of all free people.

## THE OPERATOR'S CORNER

*Concluded from page 28*

voice personality and you will not be annoyed by having to repeat what you have said.

### Traffic Questions

**(1) Is there a reduced rate period on Mobile Service calls?**

**(2) If a request is received for the rate to a train, what information is given to the customer?**

**(3) If an MS operator leaves a circuit request, what information is entered on the Circuit Request ticket?**

**(4) On a Mobile Service call, if a distant inward operator says, "This is the (place) Mobile Service operator. Order (no.) but do not ring. Let me know if it is busy." How should the outward operator proceed?**

**(5) If a customer calling a Mobile unit wishes to bill the call to a credit card, how should the request be handled?**

***Answers are presented on page 56.***

### Iowa Independent Secures Option To Buy Neighbor

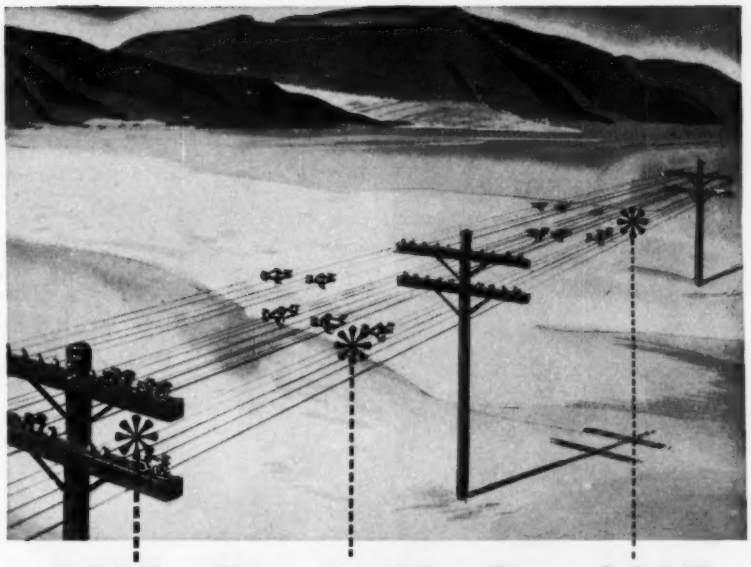
The Griswold (Ia.) Co-operative Telephone Co. obtained an option on Feb. 3 to purchase the Elliott Mutual Telephone Co.

The announcement was made jointly by Lawrence Amos, president of the Griswold company, and Everett Carson, president of the Elliott company.

The transaction is subject to REA approval of a request for funds to rebuild the Elliott system, it was reported.

### Secret of Success

"The fact is that private enterprise is the secret of this country's economic success. The fact is that state control is the secret of the Soviet's relative failure so far. They are now going to try to modify that control, but still within the framework of Communist economics."—*The Wall Street Journal.*

CASE after CASE after CASE

Case®

TRANSPOSITION BRACKETS

proved best...world wide

Transposing wires to help expand toll circuits, carrier systems, balance out cross-talk and reduce noise levels has proven itself, installation after installation, throughout the world. Case aluminum Transposition Brackets for cross-arm and span-point transpositions have proved to be the outstanding choice.

- **NEW, IMPROVED DESIGN . . .** the cross-arm mounting slot **now extended to fit all standard 12" and 8" pin spacings.**
- **UNIQUE SPAN-POINT DESIGN . . .** the **only** bracket designed especially for mid-span transpositions . . . eliminates special transposition poles.
- **LIGHTWEIGHT . . .** non-corrosive aluminum cross-arm bracket—4 lbs.*; span-point bracket—3½ lbs.* *(including insulators and bushings)
- **ROLLER SYSTEM . . .** insulators roll, eliminating wire dragging, bracket distortion and protecting wire insulation in stringing.
- **SPECIAL RUBBER BUSHINGS . . .** assures continued communication service in the event of glass insulator breakage.

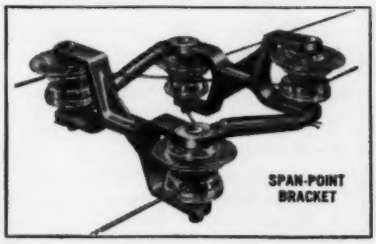
SOLD BY LEADING DISTRIBUTORS IN THE U. S.

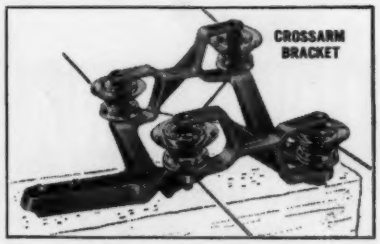
**CASE BRACKETS . . . STRONG, LONG-LASTING, ECONOMICAL, ESPECIALLY ADAPTED FOR CARRIER-CIRCUIT CONSTRUCTION**

Write today for free illustrated brochure.

TRANSANDEAN ASSOCIATES, INC.

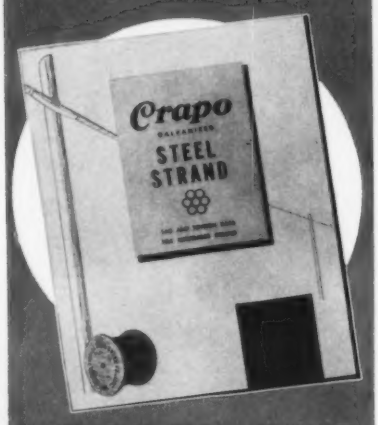
305 MAIN STREET, ORANGE, NEW JERSEY



# Now Ready!

**Sag and Tension Data For Strand When Supporting Telephone Cable**




**WRITE FOR THIS NEW MANUAL!**

Those who design, build and maintain aerial telephone cable lines will find the technical information in this manual both pertinent and useful.

The sag and tension data cover three sizes of "Utilities Grade" strand when used as messenger to support plastic-sheath or lead-sheath cable. These data will be helpful in determining the size of strand to be used for a particular weight of cable and span length, and in answering other questions relating to design problems.

This Manual will be mailed without obligation to all interested telephone men. Ask for Manual No. MS-58.

**Crapo Galvanized Steel Strand (for both messenger and guys) is available in all standard sizes and grades and in Class A, B and C coatings.**

**INDIANA**

**STEEL & WIRE CO., INC.**

**Muncie, Indiana**


## Obituaries

JOHN HENRY LEVIS JR., 73, of Brighton, N. Y., retired assistant engineer for Stromberg-Carlson Co. telephone division, died of a heart attack on Feb. 12 in his home. Mr. Levis had been associated with Stromberg-Carlson for 47 years.

In the early 1920s he developed a simplified super-service telephone switchboard which minimized the number of lights and plugs an operator had to use. Because of this invention, Mr. Levis was among a group of men honored in New York City in 1940 at a dinner held in observance of the 150th anniversary of the American Patent System.

Mr. Levis retired in 1950.

He was educated in Rochester and went to work for Stromberg-Carlson in 1903 in the switchboard installation room. He soon was advanced to foreman in charge of wiring and assembling switchboards.

In 1910 he was transferred to the experimental laboratory and in a few years was recognized as one of the leading circuit designers in the nation.

As a sales engineer he traveled throughout the east, south and west supervising switchboard installation. When he retired he was in charge of the circuit division of the Stromberg-Carlson engineering department.

Mr. Levis was a member of the American Institute of Electrical Engineers.

•

MRS. NAOMI SPRY, 45, co-owner and secretary of the Community Telephone Co., Howard City, Mich., died on Feb. 10 in her home after a short illness.

She and her husband, Albert, moved to Howard City three years ago when they purchased the Community company which has more than 500 subscribers.

Surviving, besides her husband, are six sisters, Mrs. Mary Sheppard of

### Answers to Questions On page 55

**(1) No.**

**(2) Say for example, "The rate depends upon the location of the train when conversation starts."**

**(3) Enter "MS" and the operator number if given in the "Operator" space on the Circuit Request ticket.**

**(4) The operator should proceed as directed.**

**(5) The request should be handled in the usual way.**


**Teleprinter COMMUNICATION**

***Low Cost Compact Self-Contained All Electronic*** ®

# Comtel

## TELEGRAPH TERMINAL

***For High and Low Speed Telegraph Communication***

Provides 14 frequency shift telegraph channels in the voice band from 765 to 2975 cps. All essential controls are provided together with an internal 60 MA loop supply for the operation of teleprinters. Equipment is available as a dual transmitter, dual receiver, or transceiver for either simplex, half-duplex, or full-duplex operation. Equipment may be applied to telephone lines, or VHF and Microwave circuits for transmission.

***Special Accessories for Telegraph System Applications***

The DC Hybrid Accessory HA-8555 will provide for half-duplex telegraph operation with break-in facilities on an all electronic basis. The Party Line Keying Accessory HB-8691 may be used in party line applications where frequency shift keying is desired. The Leg Adapter Panel HB-8690 provides convenient patching facilities and relay keying for neutral and polar operation over DC lines.

**WE CAN HELP YOU**

**Our 35 years of electronic experience is yours for the asking. Send for our New Product sheets fully describing the Model 995 Comtel and various accessories.**

***Radio Frequency***

**LABORATORIES, INC.**

**Boonton, New Jersey, U. S. A.**

Richmond, Va.; Mrs. Frank Moore of Oconomowoc, Wis., and Mrs. Helen Kripko, Mrs. Victoria Doolittle, and Mrs. Jane Gardner, all of Detroit, and Mrs. Lisa Bradley of Stanton, Mich.; and two brothers, Daniel and Fred Kansik, both of Detroit.

•

CECIL C. MURRAY, 50, district manager of the North Carolina Telephone Co., Matthews, died on Feb. 15.

## Fla. Independent Names Plant Assistant Vice President

Russell P. Hulbert, who began his career with the Winter Park (Fla.) Telephone Co. 15 years ago as a lineman, has been elected assistant vice president of the plant department and an officer of the company, the board of directors announced recently.

Prior to his promotion, Mr. Hulbert served as assistant to the vice president of the plant department, a post he has filled this past year.

Mr. Hulbert, a native of Connecticut, was graduated from Orlando Junior College in 1948.

After joining the Winter Park Telephone Co. in 1943 as a lineman, promotions came rapidly. Mr. Hulbert moved up the ladder to positions as

R. P. HULBERT

line foreman, installer, repairman, testboard man, purchasing agent and plant engineer to the post of assistant to Vice President B. A. Galloway, plant department.

## Naylor Named Vice President Of United Utilities, Inc.

J. T. Naylor was elected vice president of United Utilities, Inc., Kansas City, Mo. on Feb. 7.

In announcing Mr. Naylor's election, Alden L. Hart, president of United Utilities, Inc., stated that rapid expansion of subsidiary company operations had recommended this addition to the

J. T. NAYLOR

administrative staff of the system's parent investment company.

On Dec. 31, 1957, wholly-owned United telephone affiliates were providing service in 14 states.

Mr. Naylor will also continue in his


B T for drug stores

the BN Booth

attracts revenue with its colorful, clean appearance ... retains profits with sturdy maintenance-free construction.

The BN Booth is best for you, too!

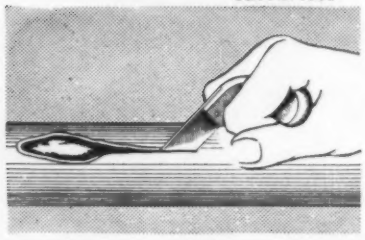
For full particulars, consult your distributor or write direct for folder... Benner-Nawman, Inc., 3421 Hollis Street, Oakland 8, California.

a B-N booth is a busy booth!

# NEW KLEIN
## stripping tool
### *for all types of control cable*

Patents 2398979
2691822

Cat. No. 1558



Here is a new tool developed by Klein, designed to strip insulation from all types of control cable, flexible cords, PWC, telephone cable with vinyl or polyethylene jackets and bus drop.

Handle of cast aluminum, light in weight and with convenient grip; knife of tempered tool steel may be sharpened and is easily removed for replacement. This tool strips insulation from a few inches to as many feet as desired swiftly and simply. Does not damage conductors inside weatherproof sheath.

Write for bulletin giving complete information.

**FREE POCKET TOOL GUIDE**

100 years of service to linemen, electricians and industry is back of this new Pocket Tool Guide No. 100. A copy will be sent you on request without obligation.

**ASK YOUR SUPPLIER**

Foreign Distributor:
International Standard
Electric Corp.
New York

Mathias Klein & Sons
Established 1857 — Chicago, Ill., U.S.A.
7200 McCORMICK ROAD • CHICAGO 45, ILLINOIS


other present responsibilities as president of United's telephone subsidiaries operating in Arkansas, Kansas, and Missouri and as vice president of the nine other telephone companies in the system. He was engaged by United in September 1956 after serving six years as chief telephone executive in the Philippines where he was responsible for the physical and financial reconstitution of that country's telephone system. Prior to 1950 he was active in Pacific Coast telephone company administration.

## Named Safety Director of General of California

An announcement of the appointment of C. C. Davis, general plant construction supervisor of General Telephone Co. of California to that of director of safety was made by Dean M. Barnes, operating vice president of the company.

Mr. Davis has had 28 years of telephone experience. In 1925, he joined the staff of Northwestern Bell Telephone Co. holding positions in western Nebraska and South Dakota. He joined General Telephone Co. of California in 1936 as an instrument repairman in Ontario. He subsequently held positions as lineman, installer, PBX man, installation supervisor, station equipment supervisor, and general plant construction supervisor working in Covina, Redondo Beach, Laguna Beach, Long Beach, and at the general office in Santa Monica.

C. C. DAVIS

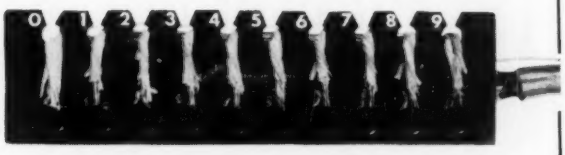
Prior to World War II, Davis was a first aid instructor at Laguna Beach High School and devoted all of his evenings during the first two years of the war training civilian defense workers in first aid.

Cora Deem Craig, (right) a long distance operator with the Knightstown (Ind.) Telephone Co. is shown accepting the 1957 Outstanding Citizen award of the Knightstown Business and Professional Women's club from the club's president, Mrs. Ethel Bridges. Mrs. Craig was honored for the many services she has performed for her fellow citizens in her 37 years of service with the Knightstown company.

# *30 Day Free Trial Offer!!*

## The All New Terminating Board Model TBZ

*for use with the Murphy Cable Tester*




We'll gladly send one TBZ Terminating Board to each division or area for a 30 day free trial. No obligation! If you don't see that the fabulous TBZ will *save you money, save hours of time, is simpler to use,* and *has a wider variety of uses,* send it back in 30 days and there will be no charge.

TBZ's simplified construction uses only ten standard binding posts instead of 20 special ones . . . ten slots instead of 101 holes as in standard tag-boards. No holes to spread wires through. Lay them speedily in ten clearly numbered slots.

Only $25 each. Greater savings when ordered in quantities. Write for additional information on the TBZ as well as a complete brochure of all Murphy products for the telephone industry.

ELECTRONIC RESEARCH DEVELOPMENT MANUFACTURE

**MURPHY** ENGINEERING LABORATORIES, Inc.

4419 Tulsa Houston 24, Texas

## Because . . . the B-4 does so much more

# Telephone Companies

### Will save many valuable dollars in time saving and in cost of materials . . . because

- Film projection transparencies for training departments can be made as easily as a paper copy and at a very low cost. A new, simple coloring method now available.
- Sharp, letter or legal size, black and white copies can be easily made from all types of originals, regardless of color of inks, single or double sided, in less than a minute right under fluorescent lights.
- With exclusive design for copying from books, only the one page being copied is inserted on the copy glass. This assures perfect contact and sharp copies.
- Inexpensive masters can be made for use on Blue Print or White Print machines.
- The B-4 photocopier was developed after years of study and research in the photocopy field to give you an "all purpose" copy machine.

**The new B-4 Lumoprint "all purpose" copying machine**

KwikKopy Co.
608 South Dearborn Street,
Chicago 5, Ill.

Please send complete information on the new "all purpose" B-4 Lumoprint photocopy machine (No obligation).

NAME_____ TITLE_____

COMPANY_____

ADDRESS_____

CITY_____

ENDURPRENE

• DROP • BRIDLE

PREMIUM GRADE INSULATION—TOUGH, ENDURING NEOPRENE JACKET

A COMBINATION HARD TO BEAT FOR LONG-RUN ECONOMY AND RELIABILITY

KELLOGG

DISTRIBUTED BY

KELLOGG SWITCHBOARD AND SUPPLY COMPANY

A Division of International Telephone and Telegraph Corporation

MANUFACTURED BY

GENERAL INSULATED WIRE WORKS, INC. PROVIDENCE, R. I.

## NEW DEVELOPMENTS

*Continued from page 33*

rection and dial in the other in the same channel unless external applique panels are added.

•

*New Type Cable Lasher (Fig. 67).* The lashing method of attaching cable to messenger has grown tremendously in popularity with telephone engineers since its advent several years ago. Recently, a new cable lashing and tool were introduced.

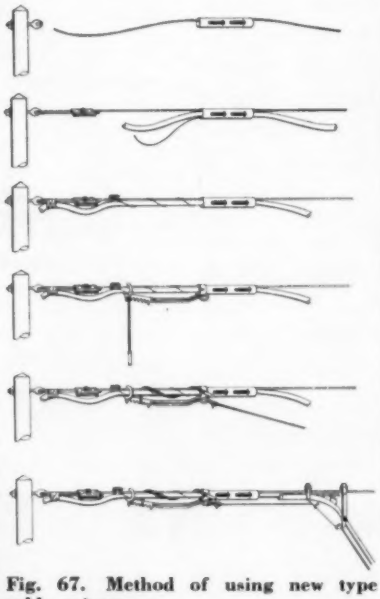


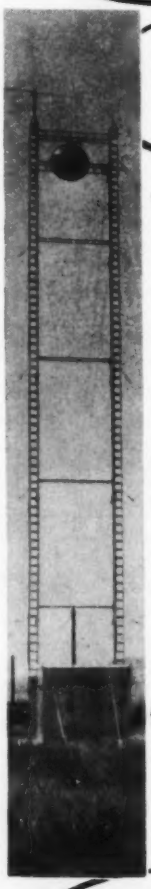
**Fig. 67. Method of using new type cable spinner.**

The procedures used with this new method may be best explained by referring to the line drawings in *Fig. 67*. Simply stated, it consists of drawing a pre-coiled tube of lashing wire along a messenger and cable in such a way that the wire coils are transferred to the messenger and cable, lashing them tightly together. Lashing wire of .045-inch in diameter is precoiled in a cylinder 2 inches in diameter and 13 inches long. Each 2-inch cylinder contains 150 feet of wire.

It is important to remember that the wire must uncoil from the front end of the tube and pass through the coils to the rear as the tube is moved along the messenger in the direction of the arrows printed on the outside.

Additional coils or parts of coils may be spliced to the original with an appropriate sleeve and tool, as may be required for longer spans. Each tube, containing wire, is marked with transverse lines equally spaced throughout its length. Each line indicates 10 feet of wire so short lengths can be esti-

If it's TOWERS you need, check ROHN FIRST!



AMERICA'S FINEST COMMUNICATIONS TOWER OF ITS KIND . . . WITH EXCLUSIVE BUILT-IN ECONOMY

√ **Reduce Costs**

—by getting a tower *specifically for your* job. These towers are suitable for use up to 300 feet guyed—or self supporting to 50-60 ft.! ROHN towers are in daily use for micro-wave, radio and dozens of all type communications requirements throughout the U. S.—at big savings—yet more than do the job! Can be used for a multitude of jobs.

√ **Proven design**

—get full engineering data to prove superiority. Gleaming, hot-dipped galvanized finish available—stays shiny and new—no painting needed. Design fully tested—proved by thousands of installations. Easily shipped and inexpensively installed. Cross pieces form natural ladder for servicing.

√ **Special Towers**

—you're invited to submit your requirements. Towers will be built to your specifications if practical. Let us know your needs—ROHN can satisfy them BEST when it comes to towers of this type.

*Illustrated here is a micro-wave installation of Rohn No. 40 tower for use by Public Service Company of Colorado for a state-wide communications system—one example of the thousands of ROHN towers now in use.*

FREE

Send for new "Specifications & Price" catalog for Rohn Communications Towers. Your inquiry will receive prompt attention. Rohn representatives are coast-to-coast to serve you. Write—phone—wire

**ROHN** *Manufacturing Co.*

**116 Limestone, Bellevue**
**Peoria, Illinois**

"Pioneer Manufacturers of TV and Communication Towers of All Kinds."

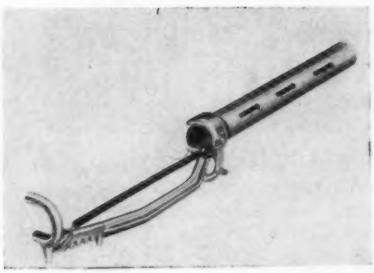


**Fig. 68. Cable lasher with tensioning spring.**

mated with sufficient accuracy. Sufficient wire, whether from one, or more than one coil should be provided at the beginning of the operation, as coils cannot be added if the wire is exhausted in midspan.

This lasher will accommodate cables up to 1¼ inches in diameter using messengers up to 5/16-inch in diameter. *Fig. 67* shows the cable lasher equipped with its tensioning spring.

We realize that because of the rapid progress now being made in our ever-changing and progressive industry, many new items have probably been brought out since this article was prepared. We have done our best, however, to obtain up-to-date information on as many new items as possible that have been released up to the start of the New Year. If we have missed anything, we are sorry and will try to do better next time.

## Prosperity and Principles

". . . a prosperity structure which is not good for the souls of men is dangerous and will fail. False principles do not become right, and are not sanctified by a period of boom prosperity!"—W. C. MULLENDORE, *chairman of the board, Southern California Edison Co.*

ALPHADUCT
DROP WIRE

for longer lasting drops

String your drops with Alphaduct. They'll last longer, serve better and lower your costs on maintenance, repair and replacement.

The tough DuPont neoprene jacket resists abrasion, aging, moisture, sunlight. The Alphaduct insulation sticks to the conductor like glue.

Step-testing during every phase of manufacture insures uniform high quality, and the handy carton packaging protects the wire until you're ready to use it.

So sure are we . . . that you'll not find a longer lasting drop wire . . . that *every* coil is dated . . . so you can see for yourself that it lasts like we say it does.

Alphaduct neoprene jacketed drop wire is available in parallel, twisted pair and dumbbell type construction. Try it.

DATED • FOR YOUR CONVENIENCE AND PROTECTION

ALPHADUCT WIRE AND CABLE COMPANY

CHarter 9-8090, P.O. BOX 709, NEW BRUNSWICK, NEW JERSEY
NATIONAL DISTRIBUTORS—AUTOMATIC ELECTRIC SALES CORP., NORTHLAKE, ILL.
LEICH SALES CORPORATION, CHICAGO, ILL.
REGIONAL DISTRIBUTORS—THE LINDSAY TELEPHONE SUPPLY CO., CLEVELAND, OHIO
PANKEY SUPPLY COMPANY, CHARLOTTESVILLE, VA.

## INTERESTED IN *SAVING* THESE?

## YOU CAN CUT YOUR MEASURING COSTS *IN HALF* by using a

# *Rolatape*

## MEASURING WHEEL

Have you ever considered how much time is consumed in taking outside plant measurements? You can cut that time *at least* in half by using a Rolatape Model 400 Measuring Wheel. Equipped with the Rolatape, *one man* can accurately and easily take measurements at a normal walking speed . . . and the total is automatically recorded in full view of the operator. These features guarantee a real saving in man-hours and money.

**FAST • ACCURATE • CONVENIENT**

You can measure with confidence when you measure with Rolatape, because accuracy is assured by its scientifically calibrated counting mechanism. Simple to operate, Rolatape measures and records total as it is rolled along. Handle folds compactly for easy storage and handling.

**Send Today for Complete Details**

**ROLATAPE Inc.**
**1741 14th Street, Dept. T-3**
**Santa Monica, Calif.**

Send me free details on ROLATAPE:

NAME_____

FIRM_____

ADDRESS_____

CITY, STATE_____


# News on New Products

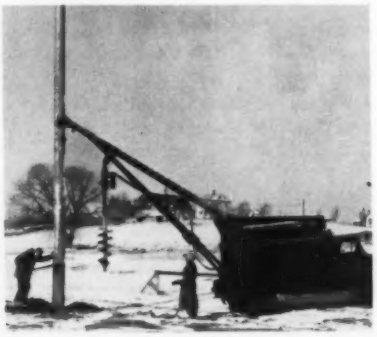
**PUSH-BUTTON DERRICK, WINCH, DIGGER**—Announcement has been made of the development by Tel-E-Lect Products, Inc. of hydraulic pole line truck equipment—derrick, winch and digger—operated entirely by push-button remote controls.

Tel-E-Lect sales manager, E. T. Michaelson, said that recent field tests of the equipment have proved this simplification of controls permits even totally inexperienced men to reach full production capacity after a maximum of only 10 minutes instruction.

Tel-E-Lect remote control head controls truck equipment through a series of toggle switches.

Through two basic new developments, a factory-assembled hydraulic control panel mounted inside the truck's cabinet wall and an ultra-simple hand-held operator's control head attached by cable to outlets in or on the truck, Tel-E-Lect has completely eliminated lever controls.

By merely moving small toggle switches on the control head, the operator has at his fingertips full control of derrick erecting, up and down movement; digger forward and reverse action; all winch line operations; truck engine speed and derrick storage.



Setting pole with push-button truck. Operator is free to work truck controls at a distance from the truck.

The operator is supplied with a 22-foot long cable from truck to control head, and can position himself at or near the working area. By being "on the spot," he is in the best possible position to make immediate adjustments of equipment as digging conditions require, Mr. Michaelson points out.

According to Tel-E-Lect vice president, Ray L. Kennedy, the push button

TELEPHONY PUBLISHING CORP.
608 S. Dearborn St.
Chicago 5, Ill.

Please have the manufacturer send me without obligation the literature indicated by the following numbers:

NP819_____; NP820_____; NP821_____; NP822_____;

NP823_____; NP824_____; NP825_____; NP826_____.

Name.....Title.....

Company.....

Street.....

Town and State.....

3/1/58

truck equipment will eliminate a great deal of the confusion that has existed in the industry because of the need to continually design new control systems to fit various models and makes of trucks.

In addition, this method of control and operation, will result in not only faster and more efficient operator training, but also in greater safety to the crew and the equipment, he said.

"Because operation of push button equipment is so simple," Mr. Kennedy said, "there is virtually no unnecessary strain put on the truck and equipment. This factor alone will result in longer truck life." He continued:

"And from the standpoint of service alone, push button equipment is extremely economical. Whereas in many hydraulic trucks, the hydraulic control systems are installed beneath the chassis, vulnerable to dirt and damage, the hydraulic controls for Tel-E-Lect's push-button unit are inside the cabinet wall.

"In the case of many chassis mounted controls, servicing is difficult. We solved this by assembling the entire system at the factory—eliminating the need for assembly and installation instructions by distributors or customers. We supply the controls ready-made for any type of truck and derrick-digger.

"A thorough book of instructions allows even an inexperienced man to 'trouble-shoot' any breakdown that might occur and to remove any faulty part for replacement in less than 15 minutes."

Pressure gauges in the control box indicate hydraulic line operation. A tachometer shows engine speed. A series of electric fuses prevent circuit overloading and can be replaced instantly.

Regardless of make or model of truck, the installation of Tel-E-Lect push-button equipment will result in standardization of all controls as well as their great simplification, Mr. Kennedy stated.

Another important feature contributing to standardizing of all equipment, according to Mr. Kennedy, is the use of a full torque split-type power take-off rather than the side mounted take-off formerly found in utility trucks.

"To insure that the new Tel-E-Lect push button unit provides an abundance of power to handle all types of work, we have gone to the split type, full-torque take-off. In doing this, we have come up with a drive system that can be used universally. It will not vary from truck to truck. This, too, means improved servicing because the same maintenance information will be provided to all units of this type," Mr. Kennedy stated. He continued:

"More important is the versatility this take-off gives the truck when bal-


Stahl

SERVES THE TELEPHONE INDUSTRY!

Stahl Side Boxes — convert pick-ups into efficient Service Trucks.

Stahl TMI-76 — Lowest-cost Telephone Body in the Industry!

Stahl TMI-76 — Engineered and built to rigid specifications.

Stahl Cable Splicer Body — built for longest, hardest SERVICE!

MAIL THIS COUPON TODAY FOR COMPLETE INFORMATION & PRICES!

Check product in which you are particularly interested.

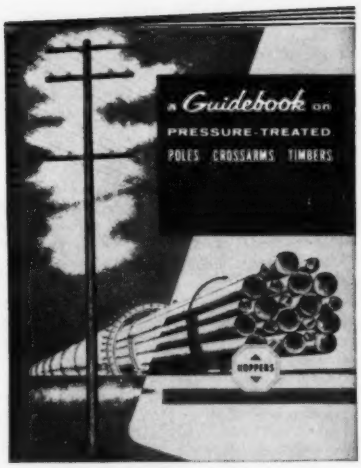
Stahl Metal Products, Inc.
3490 West 140th St., Cleveland 11, Ohio

NAME_____

ADDRESS_____

CITY_____ STATE_____






A COMPREHENSIVE 38-Page GUIDEBOOK FOR POLE BUYERS

Want to know the service records of full length pressure-treated poles versus non-pressure-treated poles? Have a problem of loading or unloading poles? Want to know specifications, or how to store, handle or measure poles? The answers to these questions and many more are in the Guidebook available from Koppers Wood Preserving Division. Purchasing agents, engineers, operating personnel and even company management executives will find valuable, up-to-date information on pressure-treated poles, crossarms and timbers used in communications systems. Write for your copy.

...a partial list of contents

- The How and Why of Pressure-Treating
- How to Unload Poles
- Poles, Crossarms, Timbers
- Pole-type Buildings
- Specifications and Dimensions

Yours FREE!

Wood Preserving Division C-7
Koppers Company, Inc.
757 Koppers Building, Pittsburgh 19, Pa.

☐ Yes—send me the Guidebook.
☐ Have a Koppers representative contact me.

Name_____

Address_____

City, Zone, State_____

KOPPERS POLES

anced with the hydraulic control system. For instance, the side-mounted take-off is rated by nearly all manufacturers at 140 foot pounds. An up-to-date pole line truck requires 190 foot pounds. Our split type take-off is rated at 300 foot pounds.

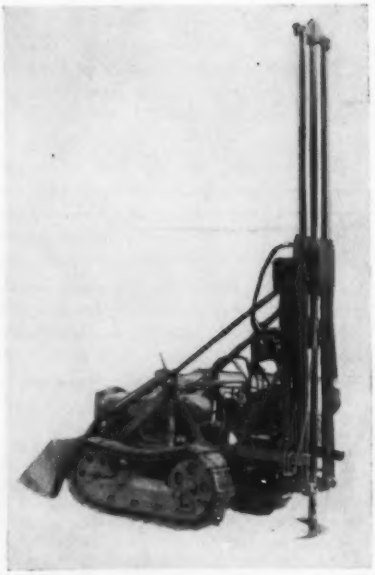
"In the hydraulic control system, is a series of valves that are pre-set to regulate the maximum power to be used by any piece of equipment. They are set below the maximum so that the system will operate at required power and yet will never put undue stress on the equipment.

"Working with actual field crews who had never before used the push-button equipment, Tel-E-Lect discovered the truck able to perform digging feats described as 'outstanding' by the crews. A few minutes of briefing from crew foremen and the men were able to start right off producing the same results as a fully-experienced man.

"Under the same conditions as any utility or telephone company crew would be operating, the push-button truck dug through frost soil measuring up to 48 inches deep. Average frost depth measured 30 inches. The truck averaged just over six minutes to dig through the frost and under 9½ minutes to complete each hole." Request NP819.

•

SEMI-HYDRAULIC DIGGER—J. R. Prewitt & Sons are offering a new semi-hydraulic industrial digger that attaches



to any industrial tractor, to cut up to 6½ feet through any kind of soil. Operated by one man, it utilizes full weight of the tractor to make from 6 to 20-inch straight holes in clay, shale, gumbo, sandstone, tree roots, and frozen ground, according to the company.

The auger turns from the tractor power take-off, and a hydraulic pump exerts continuous pressure on the hydraulic cylinders to maintain steady downward drilling force. Hydraulic "outriggers" are included for additional stability, or for use in leveling tractor to assure accurate drilling on uneven ground. Simple to mount, the entire assembly requires minimum time to install; hinged auger folds out of the way when traveling. Request NP820.

•

MICROFILM READER—Ambidextrous controls are a feature of the new "Medalist" 16mm film reader for transcribing information from microfilm records announced by Recordak Corp.

Available for the first time commercially, the film winding wheel may be placed on either side of the viewing screen. Placing it on the left is paradoxically for the convenience of right-handed people. It leaves the right hand continuously free to take notes.

All operating controls on the "Medalist" reader are within easy reach immediately in front of the screen. They are the winding wheel for advancing the film; a scanning lever for centering film images; orientation wheel for turn-


say "Lindsay"
when you order

For friendly, prompt, *complete* service in telephone supplies, more and more leading companies say "Lindsay" when they order. Lindsay specializes in telephone supplies only—warehouses a complete line of the finest nationally known brands.

THE LINDSAY TELEPHONE SUPPLY CO.

360 East Highland Rd., Northfield, Ohio
*Telephone: IMperial 7-7181*

OKOIDA

FOR THE FINEST

ing film images upright; a focusing knob; and spindles for leading the film.

A new gate-like type of aperture is self loading. The film is simply pulled across the aperture and inserted in the take-up spool. When the film starts moving, the aperture gate automatically closes and grasps the edges of the film

in V-shaped notches. These hold the film in focus at all times. The absence of glass guides practically eliminates dust scratches on the film images.

The "Medalist" reader makes paper facsimile prints without the need of a dark room. The Recordak rapid facsimile kit is used for this purpose.

The screen of the "Medalist" reader is partially shielded from overhead lighting, preserving the natural image contrast. Reading is easier and the facsimile prints are sharper, according to the company.

The reader screen is the reflection type, painted a tinted blue-white for eye comfort. It is tilted 43 degrees from the horizontal to place the film image directly in the normal line of vision. Where Kodamatic Indexing is used for coding documents directly on the film, the proper index scales are mounted along the edge of the screen.

A choice of three magnifications—24, 32, or 40 diameters—is available in the "Medalist" reader. One lens comes with the reader. In offices where more than one ratio of reduction is used in the microfilming, the other lenses are available as accessories. They are easily interchanged in the front of the screen.

The reader weighs about 60 pounds, light enough to move about the office. It occupies a desk area of 13½ by 24 inches. Request NP821.

•

INSULATED WIRE—New Dura-Stripe Teflon (Registered trade mark, E. I. duPont de Nemours) insulated wire, manufactured by The Rex Corp., has spiral stripes which are extruded as a permanent part of the insulation. They are not painted surface stripes


WHITNEY BLAKE

SELF SUPPORTING

Multiple Drop Cable

FAST INSTALLATION

STANDS UP IN ANY CLIMATE

Where multiple drops are required, WB Multiple Drop Cable does an outstanding job. The color coded polyethylene insulated conductors are twisted into pairs with length of lay systematically varied to minimize cross talk. An aluminum shield is used and a special WB black polyethylene jacket protects the whole from deterioration in any climate. WB Multiple Drop Cable is self supporting when used with spiral type deadends.

INDEPENDENT

WB

6-8

WELL BUILT WIRES SINCE 1899

WHITNEY BLAKE COMPANY

NEW HAVEN 14, CONNECTICUT

but durable, everlasting color coding as permanent as the insulation itself. Color code Dura-Stripes cannot rub off, peel off, rub out or flake, and the insulation is impervious to solvents, lubricants and chemical corrosion.

Rex Teflon insulated wires are available in solid colors or extruded stripes. They are made in accordance with MIL-W-16878 specifications, in Type E for 600-volt service or Type EE for 1000-volt service at operating temperatures from —65°C. to +200°C. Also available to meet requirements of National Aircraft Standards, Specification NAS 703. Request NP822.

•

TWO-TON CHAIN HOIST—A two-ton chain hoist is now being made by the A. B. Chance Co.

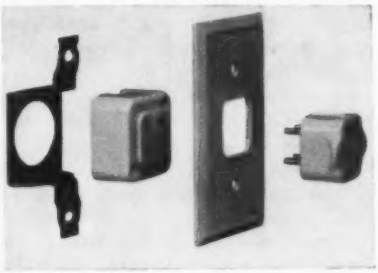
Proof-tested to 6,000 pounds, the hoist is designed for such heavy-duty work as sagging long conductor spans and pulling up slack guy wires. Weighing only 24 pounds, the hoist has an aluminum housing and handle, a shaft of hardened steel. Its controls can be operated without removing heavy work gloves.

This hoist "free wheels" at the flip of a lever, and the lever locks automatically when the hoist pulls a strain. It features 5½ feet of lift plus half and full-link take-up. All moving parts are fitted with permanently lubricated oilite bearings, and the ratchet-type handle can be operated from either side of the housing. Hooks swivel freely on ball-thrust bearings to allow for unwinding action of rope or wire under tension. Hoists can be furnished with either regular or safety hooks. Request NP823.

•

WALL PLUG AND JACK SETS—A standard four-prong wall plug and jack for flush or non-flush wall mounting is now being manufactured by the Suttle Equipment Co.

The complete assembly consists of four parts. These are the bracket which is heavily plated cadmium-chromate and has holes that fit standard wall conduit boxes; the jack which has four spring-tensioned jack holes for



better conductance, and a high-voltage fiber terminal plate; the wall plate, and the plug, with four brass prongs mounted in high dialectric test material. The plug has two ears which facilitate removal from the jack by the user.

The jack is the non-flush type, but with the addition of the plate and the bracket, it becomes a completely flush installation.

Plug and jack bodies, as well as the wall plate, are made of high-impact, high-density styrene. Attractive in appearance, these components are easy to wipe clean. The plug and jack bodies and the wall plate are manufactured in brown or ivory styrene. Request NP824.

•

DRILL SET—A new package for carbide tipped masonry drill sets has been announced by Diamond Expansion Bolt Co.

The drill sets are packed in a 5½ inch by 3½ inch plastic box with a snap-shut lid. Drill specifications are doubly marked inside the box on two-color card stock. These specifications can be read from the top or end of the box.

Drills are set in polystyrene plastic


TAKE A BIG STEP TOWARD SAFETY WITH DUO-SAFETY LADDERS

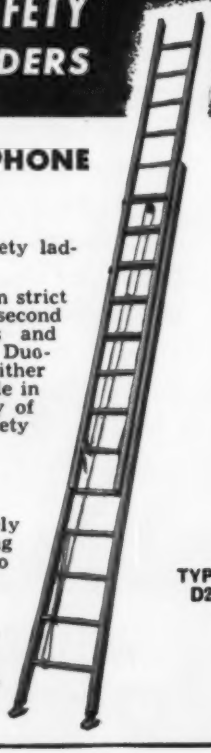
... CUSTOM DESIGNED FOR TELEPHONE MAINTENANCE WORK!

Here's one fine example of the many Duo-Safety ladders ideal for telephone maintenance work.

Type D — a truly great extension ladder built in strict accordance with safety regulations. Rungs are second growth hickory, reinforced with steel rods and equipped with special automatic locks and Duo-Safety's famous Safety Shoes. Made with either straight or parallel side rails, Type D is available in one, two or three sections — in a large variety of sizes. Write for free catalog on all Duo-Safety ladders.

IMMEDIATE DELIVERIES!

Duo-Safety ladders will be shipped immediately upon receipt of order! A planned stock-piling program assures really fast action — there's no delay the Duo-Safety way!



TYPE D2

For Information, Contact Your Supply House, or

DUO-SAFETY LADDER CORP.
809 Ninth Street • Oshkosh, Wisconsin

Weather Good

or

Weather Bad

—

No matter

what the weather

you'll

be

glad

if you've asked

us to do your

plant work—

—

Write or wire us—

if you need us—

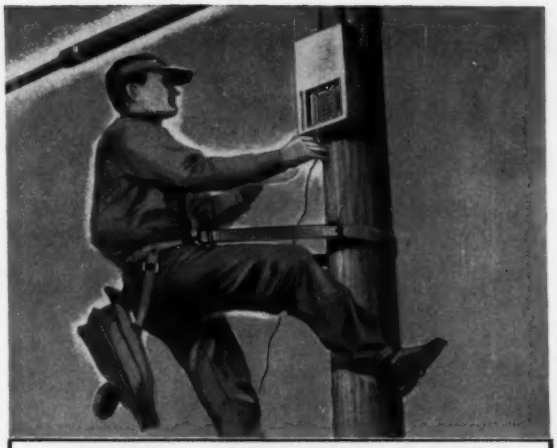
—

**GUSTAV HIRSCH ORGANIZATION, INC.**

1347 WEST 5TH AVENUE

COLUMBUS 12, OHIO

Telephone: HUdson 8-0611



**BI-SEAL**

**...THE ONLY SELF-FUSING POLYETHYLENE TAPE... IS MADE BY BISHOP**

**Now...only ONE tape for ALL drop wire splices...replaces time-consuming splicing methods requiring two tapes.**

**BI-SEAL IS THE ONLY POLYETHYLENE TAPE THAT IS...**

- Self-fusing under its own pressure.
- Virtually non-absorbent (as low as .0065%).
- Unexcelled for cold weather applications (as low as -55° C).

**BI-SEAL OFFERS...**

- Proof...years of operational experience indicate much longer weathering life.
- More protection than the original insulation.
- High dielectrical strength (approx. 1000V/mil). BI-SEAL conforms perfectly to the most complex shape.

**For complete information see your telephone supply distributor or Write today for Free Catalog on BI-SEAL and other quality BISHOP tapes.**

BISHOP

**BISHOP MANUFACTURING CORPORATION**

**12 Canfield Rd., Cedar Grove, N. J.**

**BISHOP...MORE THAN A CENTURY OF ELECTRICAL INSULATION**

INDEPENDENT

**PARALLEL DROP WIRE SPLICE**

- Wrap with a single half-lapped layer of Bi-Seal Type (No. 2A)
- Tension Tape approx. 3/4 original width. Extend tape 1/2" beyond sleeve
- Completed Splice
- Write for copies of Bi-Seal Splicing Methods, Specification BM-1

WHITNEY BLAKE

Plastic Jacketed

ARMORED TELESEAL®

FOR DIRECT BURIAL

Cuts costs in many ways

WB plastic jacketed ARMORED TELESEAL, because of its smaller diameter and its lightness, is handled at unusually low cost. Designed for direct burial, WB ARMORED TELESEAL is impervious to rot, resists the stresses resulting from frost heaving, withstands the abrasion caused by soil shifting and rock movement and is protected from rodent, termite and mechanical damage by the served armor of flat steel wires. WB ARMORED TELESEAL may be plowed in for additional economy. Its long life, together with its stable electrical transmission characteristics give you the true economy that comes only with a quality product.

WB

3-8

WHITNEY BLAKE COMPANY

NEW HAVEN 14, CONNECTICUT

WELL BUILT WIRES SINCE 1899

INDEPENDENT

**foam, slotted to match individual drill diameters. Each package contains five spiral twist carbide tipped drills from 3/16 inch through 1 inch. All drills have a ¼ inch shank. Request NP825.**

•

**CABLE REEL LIFT-STAND—Easily carried on the job, the Reelift, manufactured by Hykon Mfg. Co., requires only two men to set up full reels of 500,000 or 750,000 CMC, ready to pull in minutes.**

**The Reelift provides a safe, rigid base for fast cable pay-out and can be readily adjusted to handle reels of any**

**diameter up to 48 inches. Damaged or broken reel flanges are no problem, the company states.**

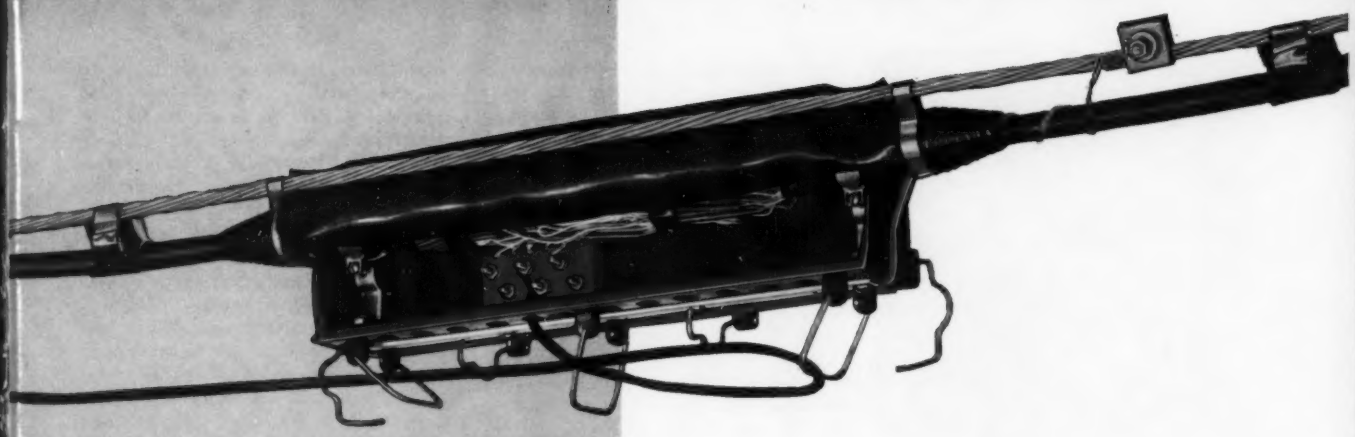
**The device is all-welded and heavy-duty constructed; exposure-protected by an industrial enamel finish. It measures 3 feet x 2 feet on the base, 4 feet in height. Request NP826.**

## Budelman Radio Corp. Moves To Larger Quarters

Barnet S. Trott, chairman of the board, recently announced that the Budelman Radio Corp. has moved all operations to a larger more modern building at 375 Fairfield Ave., Stamford, Conn.

Budelman Radio Corp. manufactures telephone carrier equipment and microwave point-to-point radio equipment for industrial and commercial use, as well as specialized electronic items.

According to Mr. Trott, the move was dictated by the interest in new products now in development and approaching completion, together with an



One section of a busy assembly line.

Terminal Blocks filled with thermosetting reinforced polyester resin.

Ready-Access Cable Terminals ready for shipment.

# Meeting your demands!

## Reliable Ready-Access Cable Terminal

Reliable's busy production lines are keeping up with the Industry's requirements for the 100 Series Ready-Access Cable Terminal.

This easily installed and easily maintained terminal and splicing facility is designed for use with plastic jacketed and plastic insulated conductor cable. Up to four 6-pair Reliable No. 105 Terminal Blocks can be added or the space can be used for loading coils.

The flexible neoprene cover is conveniently folded back while internal wiring is altered to meet changing requirements.

*Reliable Catalog 100 includes complete details of the Ready-Access Cable Terminal. Write for your copy.*

Reliable ELECTRIC COMPANY • FRANKLIN PARK, ILL.

A HALF CENTURY OF SERVICE TO THE UTILITIES

**7,000,000 duct feet of tile laid using these M.T.D. Sleeve Connectors.**

**WHY? — Low cost! Saves time! Insures tile alignment.**

*ASK FOR QUOTATIONS ON 2, 4, 6, 8 AND 9-WAY SIZES*

•

*(Ask for Catalogue: TE)*

Sheboygan GL 7-4488

**PLYMOUTH INDUSTRIAL PRODUCTS, Inc.**

PLYMOUTH and SHEBOYGAN, WIS.

**JACK UP line crews' EFFICIENCY with the NEW LIGHTWEIGHT Aluminum SIMPLEX REEL JACK**

**Aluminum alloy housing reduces weight 21 pounds . . . full 10 ton lifting capacity maintained!**

The new Simplex A1029 Reel Jack increases your men's efficiency by minimizing fatigue. Its lighter weight is a distinct advantage in loading, unloading and carrying to location, and its single-acting mechanism provides much easier lifting. Capacity 10 tons; weight 83 lbs. For reels up to 84" dia. Supplied with sturdy, laminated oak "T" base and 5' lever bar. Write today for full information.

**Other SIMPLEX lightweight Leaders**

**A1538**—Aluminum Pole Pulling & Straightening Jack; 15 tons cap., weight 63 lbs.
**A1022**—Aluminum Ratchet Lowering Jack for general lifting and lowering. Capacity 10 tons, weight 42 lbs.

Simplex Jacks

TEMPLETON, KENLY & CO.
2557 GARDNER RD.
BROADVIEW, ILL.


increased demand for the present line of equipment.

The new plant is a one story building twice the size of the old one. It features a production area, engineering laboratories, and modern offices.

## John E. Ostline Retires From Automatic Electric

John E. Ostline, who has earned an international reputation for outstanding achievements during his career, has retired from General Telephone Laboratories, Northlake, Ill. Foremost among his achievements are his invention of an automatic toll ticketing system, and his many contributions to the development of that invention into the commercial system known today as SATT (Strowger Automatic Toll Ticketing).

Mr. Ostline, who came to this country from Sweden in 1905, started his telephone career as a combination lineman, installer and maintenance man for an Independent telephone company near Litchfield, Minn. During the next few years he worked in various Independent and Bell exchanges in the Northwest. In 1907, he was appointed wire chief and assistant toll chief in Fargo, N. D.

J. E. OSTLINE

He next joined the Dakota Central Telephone Co., a pioneer in the use of automatic equipment, where in the ensuing decade he became intimately acquainted with automatic switching. In that period, he also worked on that company's toll dialing network, one of the earliest applications of this type of operation.

In 1918, Mr. Ostline joined the old Tri-State Telephone Co., St. Paul, Minn., as an assistant traffic engineer. In that capacity he helped to install the first call indicator boards and carried out traffic and engineering studies on them and on service observation equipment. His performance in that assignment came to the attention of Automatic Electric Co., and an invitation to join that Chicago organization was tendered and accepted in 1922.

Because of his experience and extensive knowledge of the techniques of multi-office automatic switching, he was sent, in 1923, to London, England, where during the next six years he was to play an important role in converting the world's largest city to dial. In connection with that assignment, Mr. Ostline designed the coder call indicator system that was used in this conversion and made significant contributions to the design of the director equipment developed for that conversion the year before by Automatic Electric.

It was in 1923 that Mr. Ostline started working on an automatic toll ticketing system. Two years later he applied for a patent on the invention and it was issued on June 12, 1928.

His assignment in England completed in 1929, Mr. Ostline returned to Chicago and developmental work on various types of automatic switching systems. Early in 1938 came another call from abroad. This time it was a request from Automatic Electric's affiliated manufacturer—Automatique Electrique, S. A.—in Antwerp, Belgium, for the services of a resident engineer in connection with the development and installation of an automatic toll ticketing system at Mons, Belgium.

He returned to Chicago the following year, after the completion of his work for that installation, and began work on the further development of the automatic toll ticketing system for American operating conditions. It was he who fostered the pilot system, installed in the Santa Monica exchange of General Telephone Co. of California in April 1944, and guided it through all its trials.

The first Independent commercial application of SATT in this country was made in 1948 in Sunland, Cal. The equipment used in that installation, too, was designed by Mr. Ostline.

With the introduction of nationwide customer toll dialing in the 1950's, Mr. Ostline designed additional new automatic toll ticketing systems for enlarged scopes of Direct Distance Dialing (DDD) and the various operating problems encountered in Independent exchanges. Much of his work has gone into the systems serving metropolitan Los Angeles and Chicago.

During his career, Mr. Ostline has contributed a record number of inventions which have resulted in commer-

cial use. Eighty-nine U. S. patents have been issued to cover those inventions. Ten applications for patents are still pending, and several cases were being considered for filing at the time of his retirement. Patents and applications in foreign countries—primarily England, Italy and Belgium—total 367.

The greatest number of Mr. Ostline's inventions have been in the area of toll ticketing and related systems. Forty U. S. patents—those now pending, and those cases still to be filed—and 136 foreign patents and pending applications have resulted from his work in this area. The remaining patents and applications have grown out of inventions relating to various other categories of telephone equipment and operation.

Mr. Ostline, a Strowger Club member, was honored in 1947 with the Talbot G. Martin Award, presented for outstanding achievement in the art of communications.

He is a Fellow of the AIEE, and a "Chartered E.E." in Great Britain.

## Barber-Greene Names Three To Executive Posts

H. A. Barber, president of Barber-Greene Co. has announced the promotion of Carl T. Curtis to vice president, Aurora plant manager; Frank J. Merrill, to vice president, DeKalb plant manager and W. Alex Greene, to be manufacturing coordinator.

Barber-Greene manufactures bituminous, or "black-top" paving equipment and also is well known in the mechani-

C. T. CURTIS

cal ditch digger, railroad car unloader, truck loader and conveyor fields.

Mr. Curtis has been a member of the Barber-Greene organization since 1947 and during that time has been general superintendent of the company's main manufacturing facility in

F. J. MERRILL

Aurora. Prior to his association with the company, he was an industrial engineer and superintendent of a metal working plant near Chicago.

Mr. Merrill began his Barber-Greene career in 1940 in the sales department and later became secretary to H. A. Barber. During World War II he was a captain in the U. S. Army Corps of Engineers. Returning to Barber-Greene after the war he became sales training

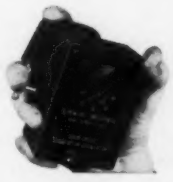

Stewart

TEST EQUIPMENT

Locates Trouble FAST

1000 Cycle TRANSISTOR OSCILLATOR

Model J



A Stable power source, for locating trouble in carrier systems and audio equipment.

Self contained mercury battery with operating life over 700 hours.

Pocket size, 2¼"x3"x4", Wt. 10.3 Oz.

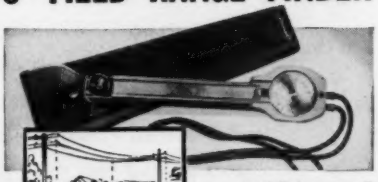
STEWART BROTHERS
Division of Instrument Laboratories
Chicago 10, Illinois

TRUCO
Safety
Hydraulic Derrick

- TRUCO safety Hydraulic Derrick "middle leg" allows simple, fast, safe one-man operation.
- Simple Hydraulic cylinder in "middle leg" makes Derrick a "Live" boom.
- Converts to powerful pole jack. Unique folding mechanism permits greater use of space in rear of body.

Truco
TRUCK Equipment CO.
3963 Walnut Street
Denver 5, Colorado

SAVE TIME and MONEY!
WITH A
6" FIELD RANGE FINDER



. . . Widely used by 'Phone and Utility Companies

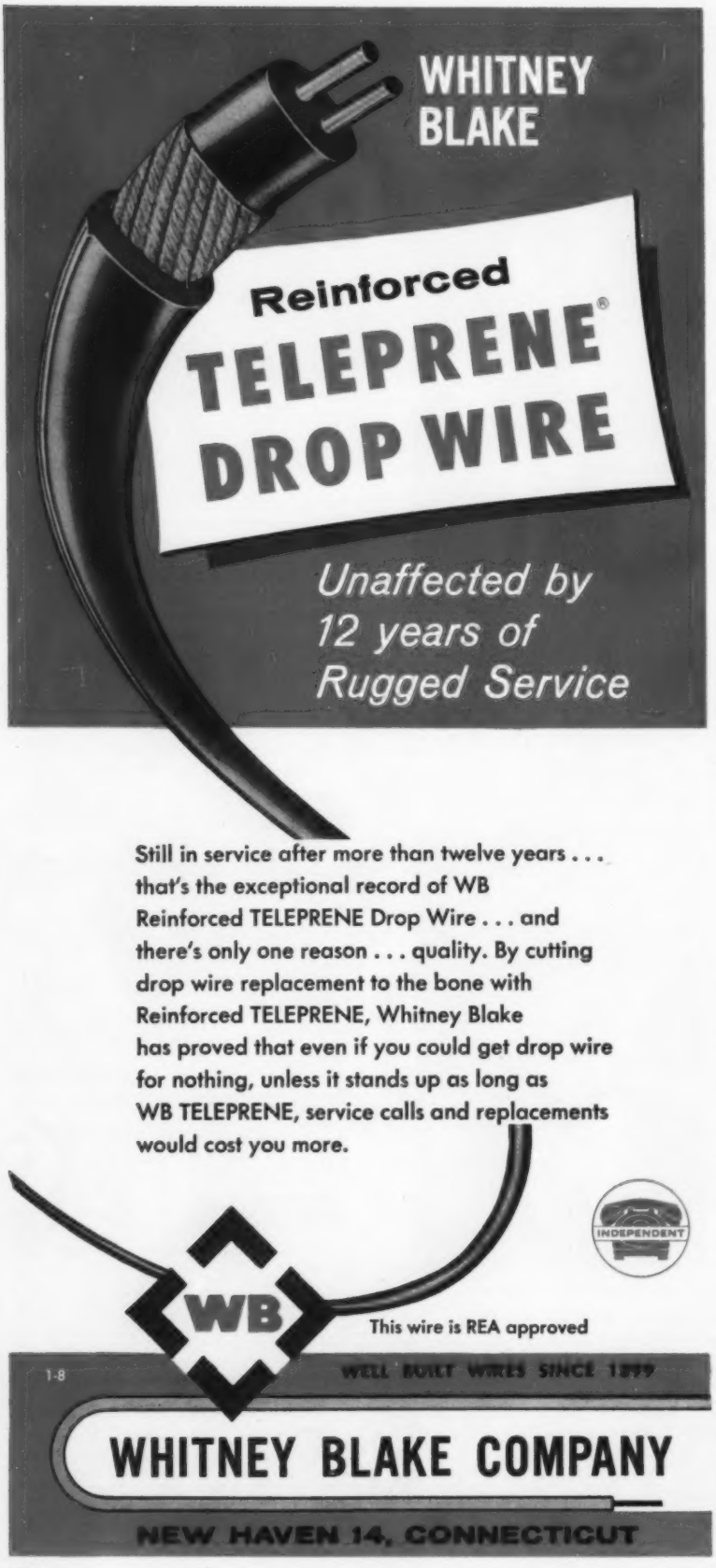
Speed erection and maintenance of Telephone and Utility lines with this 6" Field Range Finder. Measure line clearance, spacing and sag from the ground. Measure distances from 8 ft. to 100 ft. with accuracy to within 2%. Especially useful for inaccessible objects and places. These are sturdily built instruments . . . of such compact size they're easily carried in pocket. Dependable for years of trouble-free service in rugged use. Available in two models —Direct Vision and Overhead Prism. Each supplied with a top-grain genuine leather carrying case. Order by Stock Number (open account to rated firms).

Stock No. 50,137-DL Direct Vision Model. . $32.50
Stock No. 50,138-DL
Overhead Prism Model. . . . . $43.50

Write for FREE CATALOG—DL

World's largest variety of optical items—Microscopes, Binoculars, Telescopes, Infrared Snipperscopes, Satellite Scopes, Lenses, Prisms, Reticles, etc.

EDMUND SCIENTIFIC CO.
Barrington, New Jersey


WHITNEY
BLAKE
Reinforced
TELEPRENE®
DROP WIRE
Unaffected by
12 years of
Rugged Service
Still in service after more than twelve years . . . that's the exceptional record of WB Reinforced TELEPRENE Drop Wire . . . and there's only one reason . . . quality. By cutting drop wire replacement to the bone with Reinforced TELEPRENE, Whitney Blake has proved that even if you could get drop wire for nothing, unless it stands up as long as WB TELEPRENE, service calls and replacements would cost you more.
INDEPENDENT
WB
This wire is REA approved
1-8
WELL BUILT WIRES SINCE 1899
WHITNEY BLAKE COMPANY
NEW HAVEN 14, CONNECTICUT

instructor and in 1952 was advanced to assistant to the vice president. In 1954, he was elected assistant secretary of the corporation and in 1956 assumed responsibilities for the planning and construction of the company's new factory near DeKalb. This plant has just been completed.

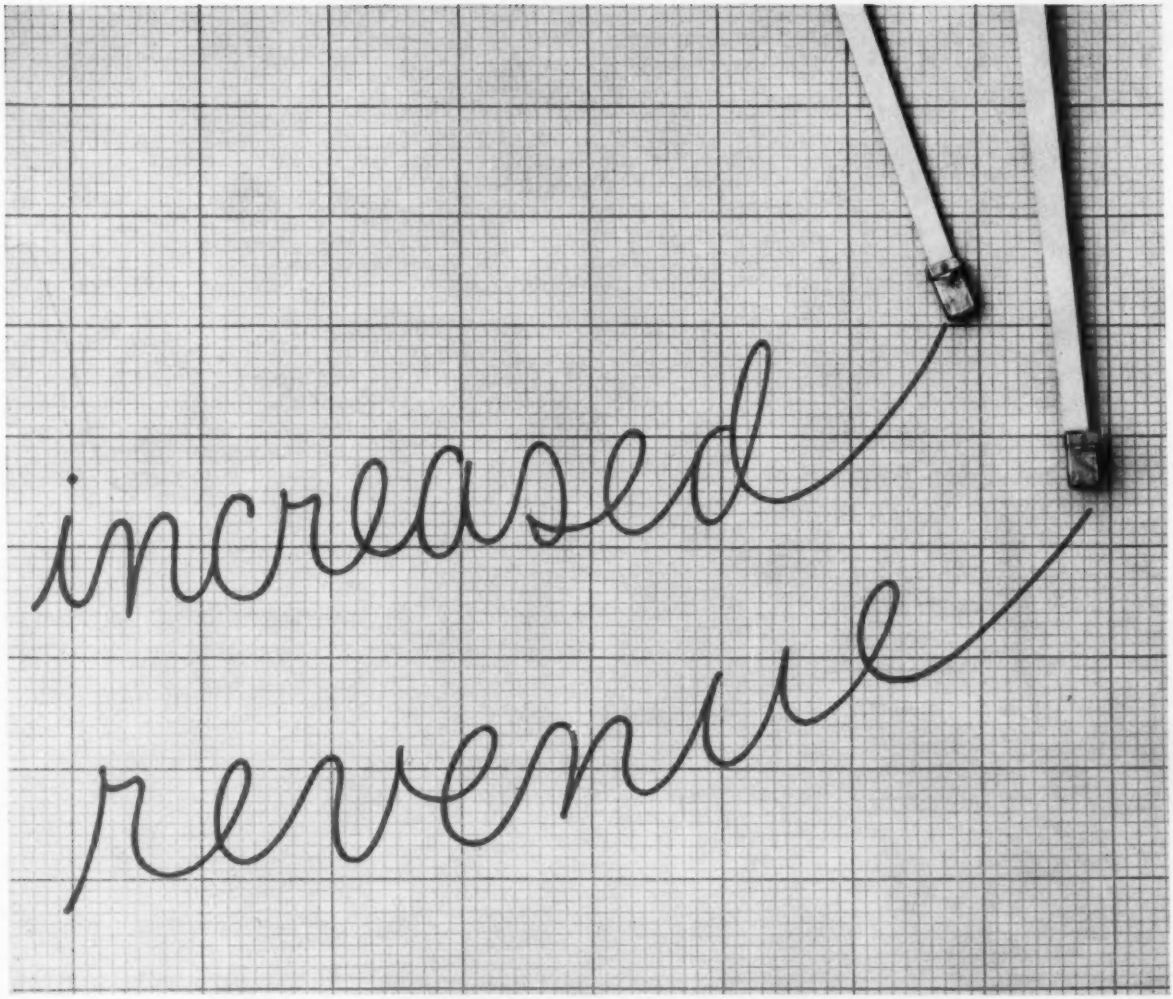
W. A. GREENE

Mr. Greene, son of the Barber-Greene board chairman, W. B. Greene, has been with the company since 1947, having served in the European Theater in the Corps of Engineers during World War II. After a period of activities in the company's production control and engineering phases, he was appointed assistant to the general superintendent. In 1954 he was elected corporation secretary. He is also a member of the board of directors.

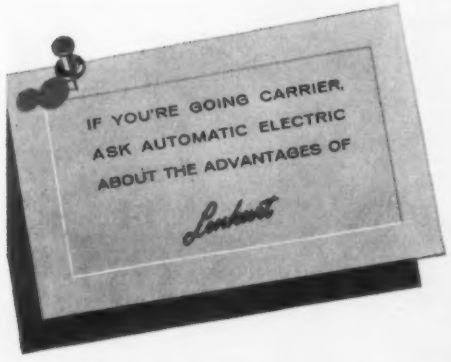
In his new post, Mr. Greene will coordinate the manufacturing activities of Barber-Greene's Aurora and DeKalb plants as well as the operations of subsidiary and affiliated companies including Barber-Greene Canada, Ltd., Toronto; Barber-Greene Olding & Co., Ltd., London, England; Barber-Greene do Brasil; Barber-Greene (Australia) and C & S Products Co., Detroit.

## Need For Tax Relief

A resolution adopted by the National Association of Railroad and Utility Commissioners last fall said: "The existing Federal excise taxes on communication services are discriminatory and contrary to the best interests of the public." At about the same time the *Los Angeles Times* reported: "One of the most practical ways of affording the average citizen some tax relief, according to U. S. Rep. H. Allen Smith . . . is repeal of the 10 per cent telephone tax. The telephone, he contends, is not only a necessity but the only utility so taxed."




# TELEMETERING...




Leasing circuits for TELEMETERING . . . one of the fast-growing new opportunities for you to get extra revenue. All over the United States, more and more circuits are being leased from operating telephone companies for the transmission of metered data (temperature, pressure, flow, etc.) to distant control points. *Who's in the market?* Pipelines, power companies, refineries, chemical processors, steel manufacturers, many others. *How can you add channels economically to tap new sources of revenue like this?* With Lenkurt Carrier, of course. Automatic Electric provides Lenkurt equipment in a complete, easy-to-own package—engineered, furnished and installed. Our engineers would be glad to help you; just drop us a line today. Automatic Electric Sales Corporation, Northlake, Illinois.

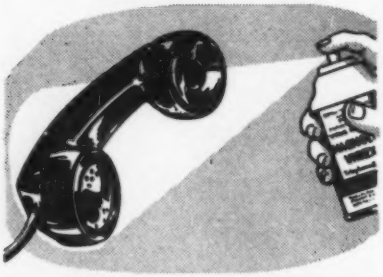
*In Canada:* Automatic Electric Sales (Canada) Ltd., Toronto. *Offices in principal cities.*

AUTOMATIC ELECTRIC

A member of the General Telephone System—
One of America's great communications systems

GENERAL TELEPHONE SYSTEM

VIREX Telephone GERMICIDE



to SANITIZE & DEODORIZE Office and Public Phones

- It is good advertising for telephone companies to germproof telephone instruments when making new installations; also on service calls and for public telephones whether in booths or not.
- VIREX Telephone Germicide will germproof a telephone instrument for about 30 days.
- It has a pleasant odor and reduces lost time caused by sickness.

MAGNOLIA CHEMICAL CO., INC.
CHICAGO • LAFAYETTE, INDIANA
ATLANTA • DALLAS • LOS ANGELES

Distributed by
LEICH SALES CORP.
427 WEST RANDOLPH STREET
CHICAGO 6, ILL. • RAndolph 6-5441



NATCO
CLAY CONDUIT

The proved and standard protection for Underground Telephone Cables. Highest quality and full line of shapes.

NATCO CORPORATION
327 Fifth Avenue, Pittsburgh 22, Pa.


## Kellogg Appoints Hollis Director of Planning

Kellogg Switchboard & Supply Co. has named William P. Hollis to the new position of director of planning. Kellogg is a division of International Telephone & Telegraph Corp. (IT&T).

Announcement of Mr. Hollis' new assignment was made by George T. Scharffenberger, Kellogg president. Mr. Hollis, a Kellogg vice president, will act in an executive staff capacity to the president.

W. P. HOLLIS

In his new duties Mr. Hollis will serve in a liaison capacity with IT&T's many research and development programs and planning. He will investigate and implement any required new products; initiate and coordinate new product planning and survey activities; formalize and present recommended organizational moves and broad operating plans on a long-range basis.

"Unprecedented opportunities still lie ahead in communications and the various related electronics fields," Mr. Scharffenberger said in announcing the new assignment. "Kellogg has spearheaded much progress in this direction and we will do infinitely more by a full-scale program of planning. Mr. Hollis has had wide experience in the telephone industry and is well qualified to discharge his new responsibilities with foresight, vigor and soundness."

Because of the broad implication of Mr. Hollis' responsibilities, advertising and public relations activities will be included as special staff functions under his supervision.

Mr. Hollis, a 14-year veteran of IT&T companies, has been, until now, director of marketing for Kellogg. In this capacity he was responsible for sales.

Mr. Hollis' former sales duties will be undertaken by O. C. Bailey, who has been advanced to general sales manager from sales manager. Mr. Bailey joined Kellogg after World War II, serving first as a field sales representative and later as district manager.

Mr. Hollis, a native of Hudson, Ia., started in telephony with Northwestern Bell Telephone Co., Omaha, Neb., following graduation from college. He later was commercial manager of telephone properties for Central Electric & Gas Co., at Sioux City, Ia., and Sioux Falls, S. D. During World War II, he worked for Chief Signal Office of the Signal Corps in New York and Washington, D. C., where he served as supervisor in the Army Communications Section.

## Different Portions

"We give advice by the bucket, but take it by the grain."—W. R. ALGER.


HARRIS-McBURNEY CO.
PUBLIC UTILITY CONSTRUCTION
*A complete construction service for the telephone industry*

Construction Crews — Engineering
Station Installers — Appraisals & Reports
Cable Splicers — C. O. Installation
Underground Duct Systems

Telephone ST 4-6126
P. O. Box 247 — Jackson, Michigan



Complete outside telephone plant builders. From frame to the phone

MULLEN CONSTRUCTION COMPANY
2002 E. Wisconsin Ave. REgent 4-9881
Appleton, Wisconsin



UNITED UTILITIES, INCORPORATED
52nd Consecutive Dividend

The Board of Directors declared a quarterly dividend of 30 cents per share on the outstanding common capital stock of the company, payable on or before March 31, 1958, to stockholders of record at the close of business March 12, 1958.

Abilene, Kans. February 7, 1958
ALDEN L. HART, President

**CABANISS-POGUE COMPANY**
*Consulting Engineers*
Appraisals—Cost and Rate Studies
Financial Assistance
GRANT BLDG., ATLANTA, GEORGIA

**CARL C. CRANE, INC.**
***Consulting Engineers***
2702 Monroe Street, Madison 5, Wis.
Telephone CEdar 3-4210

**ENGINEERING ASSOCIATES, INC.**
*Consulting Engineers*
79 W. PEACHTREE PLACE, N. W.
ATLANTA, GEORGIA
TELEPHONE: JAckson 3-5925

**McGRATH ENGINEERING, INC.**
***Consulting Engineers***
209 West 6th Street
TOPEKA, KANSAS
Telephone CE 2-2358

**SLOAN, COOK & LOWE**
CONSULTING ENGINEERS
Appraisals—Original Cost Studies
Plant, Traffic and Commercial Engineering
120 S. La Salle St.
Chicago 3, Ill. Tel: FRanklin 2-5924

**ROBERT E. FOLEY CONSTRUCTION CORP.**
DESIGN—SURVEYS—APPRAISALS—Construction and Maintenance of Overhead and Underground Telephone Plant. Complete supply of poles available for emergency requirements.
48 GRISWOLD STREET
BINGHAMTON, N. Y. TEL. 2-7215

Construction Crews Station Installers
Central Office Installations
Cable Splicers Complete Engineering
**HENKELS & McCOY**
6100 North 20th Street Philadelphia, Pa.
Now Operating in 30 States
OFFICES LOCATED AT
Elkhart, Ind. .....Tel. 2-5650
Ashland, Ohio .....Tel. 3-7543
St. Johns, Mich. .....Tel. 966
Bloomington, Ill. .....Tel. 6-1850
Schofield, Wisc. .....Tel. 9-2542
Ocala, Fla. .....
PERFORMANCE Has Built Our Business

**ATLANTIC**
Creosoting Co., Inc., 17 Battery Pl., N. Y. C.
Creosoted Pine Poles • Crossarms
PLANTS AND OFFICES
Boston, Mass. Portsmouth, Va.
New York, N. Y. Philadelphia, Pa.
Savannah, Ga.

**L. D. McFARLAND COMPANY**
Box 390 • Sandpoint, Idaho
WESTERN RED CEDAR, DOUGLAS FIR, WESTERN LARCH AND LODGEPOLE PINE. CREOSOTE AND PENTA BUTT OR FULL-LENGTH TREATED POLES.

*POLES*

B. J. Carney & Co., 100 N. 7th St., Minneapolis, Minn.—Western red cedar poles. Pentrex Butt Treated or Plain.

Cascade Pole Co., P.O. Box 743, Tacoma, Wash.—Creosoted Douglas Fir and Cedar Poles.

C. M. Christiansen Co.—Northern White Cedar Poles, Pentachlorophenol treated. Plant and Yards, Phelps, Wis.

Dierks Forests, Inc. (formerly Dierks Lumber & Coal Co.) Wood Preserving Division, 810 Whittington Ave., Hot Springs, Arkansas. Southern Pine select poles, all sizes and lengths, creosote and penta-pressure treated. Prompt shipment.

Eppinger & Russell Co., 80—8th Avenue, New York 11, N. Y.—Creosoted Poles and Cross Arms. Plants: Jacksonville, Fla., Norfolk, Va., Eddington, Pa.

International Creosoting and Construction Co., Galveston, Texas.—Creosoted Southern Yellow Pine Poles. Plants Beaumont and Texarkana, Texas.

International Paper Co., Long Bell Division, 925 Grand Ave., Kansas City, Mo. —Pressure-treated Southern Pine and Douglas Fir Poles. Creosote and Penta preservatives.

Montana Pole & Treating Plant—Box 2004, Butte, Montana. Penta-Pressure treated Lodgepole Pine and Western Larch Poles. Inquiries invited.

Texas Creosoting Company—512 Main Street, Orange, Texas—Creosoted Southern Yellow Pine and Douglas Fir Poles. Can also treat with "Penta."

**INSPECTION SERVICE AT TIMBER TREATING PLANTS**
Of poles, crossarms, and preservative treatments. Analyses of wood preservatives. Consulting and specification writing.
Inspectors stationed throughout U.S.A.
**A.W.WILLIAMS INSPECTION CO., INC.**
MOBILE, ALABAMA

FOR ALL OF YOUR CENTRAL OFFICE AND PBX INSTALLATIONS, MODIFICATIONS, AND ENLARGEMENTS, IT'S THE
**T. E. I.**
TELEPHONE ELECTRONICS INSTALLATION CORP.
Hayes Bldg., 12 E. Tenth St., Erie, Pa.
*CAN WE BE OF SERVICE TO YOU?*

**KILLOREN COMPANY**
Construction crews—Installers
Cable Splicers
30 years experience
136 N. State St. Appleton, Wisconsin
REgent 3-5549

**TUDOR AND YAGER, INC.**
***Telephone Construction***
TIPTON, INDIANA
Phone OSborne 5-2267

**CABLE SPLICERS • LINEMEN**
**STATION INSTALLERS**
STEADY WORK, GOOD PAY
MIDWEST LOCATION.
**The Weikel Line Company, Inc.**
FORT WAYNE, IND.

**YATES CONSTRUCTION CO.**
*"Specializing in Telephone Construction"*
Cable Splicers, Telephone Installers, Equipment Installers, Construction crews.
1507 SOUTH SIXTH ST. PADUCAH, KY.
TELEPHONE 2-4623

**What You Want**
**When You Want It**
**Immediate Shipment from Nearest Warehouse Points**
TELEPHONE & POWER SUPPLY, INC.
TOPEKA, KANSAS PHONE 4-8781

**EMPIRE**
—3-wire & 7-wire Strand
—Stainless & Galvanized Lashing Wire
—Pole Line Hardware
—Specialties for the Communications Industry
**EMPIRE STEEL & WIRE CORPORATION**
1506 Wesley Ave., Erie, Pa. Phone 86-542

**CABLE BREATHERS**
PROVIDE MAXIMUM CIRCUIT SECURITY WITH THE LOWEST OPERATING EXPENSE
**CABLE BREATHER CORP.**
P.O. Box 148, Kansas City, Kansas

# CLASSIFIED SECTION

**Rates 15 cents per word payable in advance. Minimum charge $3.00 for 20 words or less. Classified advertisements must reach us 8 days before publication date.**

## WANTED TO BUY

WANTED—RETIRED TELEPHONES AND ACCESSORIES, any quantities and makes. Bohnsack Equipment Co., Germantown, N. Y.

TELEPHONES—all types—any condition; candlesticks, wall sets, etc. Write advising quantities available. Our truck will pick up. Reply to Box No. 3952, c/o TELEPHONY.

INDEPENDENT TELEPHONE COMPANY with magneto telephone exchange, 500 lines or more—will convert to dial. Reply Box No. 4064, c/o TELEPHONY.

WE CONVERT 901 LEICH SETS TO 601 WITH DIAL, S.C. 1248 or 1258 to S.C. 1243 with dial. Write for prices. We are also interested in outright purchases of Leich 901 sets and S.C. 1248, and parts. Telephone Engineering Co., Simpson, Pa.

THREE EACH NORTH ELECTRIC loop dial to manual trunks, circuit No. GC-3618, wiring print No. GL-9179, and 3 connectors, circuit No. MC-8605 and wiring print No. BL 9443. Call J. S. Stoddard, c/o Piedmont Rural Telephone Coop., Laurens, S. C., Telephone 462.

CASH AVAILABLE for common and preferred stocks or bonds of telephone operating companies. Write Box No. 4050, c/o TELEPHONY.

## POSITION WANTED

MANAGER—15 years experience in plant, traffic and commercial operations of magneto, common battery and dial exchanges at district level. Married, age 37, available upon reasonable notice. Can furnish excellent references. Write Box No. 4067, c/o TELEPHONY.

EXPERIENCED MANAGER with construction and engineering background wishes to relocate. Age 39 with 17 years communication experience. Seeking position with system of 5,000 or more stations. Capable of full responsibility. Detailed résumé upon request. Write Box No. 4068, c/o TELEPHONY.

COMBINATION MAN. 38 years old. 18 years experience in magneto, common battery, and dial exchanges. Experience covers, line maintenance, line construction, station installing, central office equipment work and cable work. Capable of making up cable records, maps of the exchange and of engineering construction and cut over to dial of smaller exchanges. Up to 800 or so stations. Write Box 122, Indianola, Neb.

## HELP WANTED

CABLE SPLICERS, Station Installers, Equipment Installers, Linemen. Experienced men needed. Steady work, good pay. Henkels & McCoy, 1211 Kenmore Avenue, Elkhart, Indiana, or 6100 N. 20th St., Philadelphia, Pa.

## WANTED TO BUY

TELEPHONE ENGINEER—Nationwide, progressive utility company with headquarters in Fairfield County, Conn., has an opening for a highly qualified telephone engineer with knowledge of toll separation studies and management experience in plant, traffic and commercial departments. This position offers a unique opportunity for an engineer to use, and develop, all of his capabilities. Reply sending complete résumé to Box No. 4066, c/o TELEPHONY.

WANTED: Telephone Installers, Cable Splicers, Linemen, Central Office Installers. Yates Construction Company, 1507 South 6th St., Paducah, Kentucky. Telephone 2-4623.

PLANT ENGINEERS for large Independent Telephone Company. Some experience necessary. In reply state age, educational and employment history. Address reply to Personnel Supervisor, Rochester Telephone Corporation, 10 Franklin Street, Rochester 4, N. Y.

## FOR SALE

**Western Electric type 1011 Rubber Test Sets with large or small dial. Rebuilt $25.00 each. Telephone Equipment, Inc., Montrose, Mich.**

THREE POSITION MULTIPLE BOARD (Kellogg Masterbuilt 6-800) equipped for 600 lines. Ten trunks. CB 10 party automatic selective ringing cord circuits, relay racks, batteries, power equipment, K-5 sub-cycle, 2 pole changers, main frame, complete. Converting to dial March. Will sell very reasonable. Mid-Kansas Telephone, Inc., Sterling, Kansas.


**NEW-LAMP and JACK STRIPS**

**Western Electric #12-B Lamps on 137-B Mounting (20 per)**
**Western Electric #365 Jacks on 136 Mounting (10 per)**
**Western Electric #295 Jacks on 136 Mounting (10 per)**
**Kellogg #273 Jacks (10 per)**
**Kellogg #269 Jacks (10 per)**
**Kellogg #267 Jacks (10 per)**
**Western Electric #49 Jacks on 141 Mounting (10 per)**
**Western Electric #12 Lamps on 101 Mounting (10 per)**

**LINE and CUTOFF RELAYS — PROTECTION — LAMPS and LAMP CAPS AVAILABLE IN RECONDITIONED STOCKS**

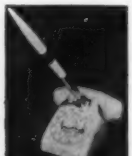
***Whatever Your Needs . . . . . It Pays to Call on BUTELCO!***

**BUCKEYE TELEPHONE & SUPPLY CO.**

**HUdson 8-0655**

**Dept. T, 1250 Kinnear Rd. Columbus 21, Ohio**





**FOR YOUR DESK AT WORK AND HOME**

***Ideal for gifts, prizes***

**Bantam colored telephone, weighted, with top quality ball point pen trimmed in gold. Telephones in ivory, sand beige, yellow, red, green, light blue, light gray, pink, white. Pens in ivory, black, red, pink. Only $3.25 complete, postpaid. Send check or money order to W. H. Parker, 2741 Ridgeview Dr., San Diego 5, Calif.**



**ORDER FROM L. E. S. AND PAY LESS**

**CABLE SPLICING TOOLS & SUPPLIES**
**PROMPT DELIVERY FROM STOCK**
**Send for Bargain Stock List No. CS.**

**LINE EQUIPMENT SALES**

**529 So. Dearborn St., Chicago 5, Ill.**

# NEW SWITCHBOARDS

**MAGNETO MFG. BY KELLOGG AND STROMBERG-CARLSON**

Navy Surplus, never used, in original factory export pack and complete with prints, operators handset, spare parts.

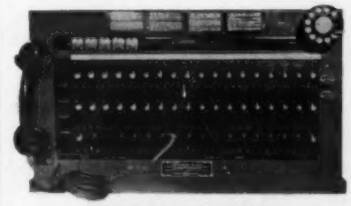
Capacity 100 lines, 50 equipped with drops and jacks, wired to 15 ft. 51/pair cable, 10 cord circuits with repeating coils and night alarm. Green hardwood cabinets. **$295.00**

**MAGNETO-COMMON BATTERY SWITCHBOARD BD-89-G MFG. BY AUTOMATIC ELECTRIC CO.**

Equipped to handle 20 magneto drops and jacks and 40 common battery lines (lamps and jacks). Magneto circ., also equipped with magneto recall lamps for each cord circuit. OTHER DATA: 13 universal cord circuits, 1 emergency ringing circ., 1 dial circ., 4 trunk circ., two-way to common battery manual or dial (automatic) exchange, 3 outgoing line circ., 2 through line circ., 1 conference circ. (5 jacks), 1 switchboard test circ., 1 night alarm, 1 fuse alarm circ., 1 battery and ground circ., 1 power and heating circ. Selective ringing, two party. Power req. 22 to 30 v dc 90 amp-hr. Back of switchboard equipped with terminal strips for all connections.

Brand New, complete with full component of spare parts & prints, export packed in sealed galvanized metal case. **$344.50**

CABINET BE-79 Main Distributing frame for Switchboard BD-89 Line protection for 80 pair, heat coils and protector blocks, 12 Simplex Repeating coils type C-161 (77A), 3 ea., 25 pair cables to connect to switchboard...New **$49.50**



**WESTERN ELECTRIC BD-116-B CORDLESS PBX**

Western Electric BD-116-B cordless PBX (patterned after WECO PBX 506-B) 5 trunks, 12 lines, 5 connecting circuits. Trunks for dial or manual service. Green cabinets, New **$145.00**

## LORIS SALES

Telephone Equipment & Supplies, Wire & Cable.
P.O. Box 1896, 907—2nd Street
Prices F.O.B. Sacramento, California

---

**CABLE*** lead, PVC, Neoprene **SAVE**
Western Electric (all new)

**909 pr. #22 ga.** (single paper lead, jute)
20 reels, 330 ft. per reel

**1515 pr. #24 ga.** (single paper lead)
10 reels, 630 ft. per reel

**37 quad #19 ga.** (single paper lead)
16 reels, 1400 ft. per reel

*all above cable f.o.b. So. Central location*

**SUBMARINE CABLE** — 20 pr. #19 ga. (double steel wire armor, jute) 1 reel, 500 ft.

**ANKOSEAL,** type 275, 101 pr. #22 ga. (color coded) PVC jacket & ins. 3 reels, 1000 ft. per reel

**NEOPRENE** jacket, 5 pr. #19 ga. color coded, 1000 ft. reels, 5c ft.; 10 pr. # 19 ga. color coded, 1000 ft. reels, 10c ft.

*above three items f.o.b. Los Angeles*

**Limited Supply**

**COPPERWELD LINE WIRE, # 12 (.080") 40% cond.**
**new factory coils (average 100 lbs.)**
**A-1 export wrapped.....37c lb.**
**slightly tarnished .....32c lb.**
**quantity discounts FOB Los Angeles**

**Shipped on Approval**

## The Telectric Co.

**1218 Venice Boulevard** **Los Angeles 6, California**
**Richmond 8-2249**

---

**WE ARE MOVING OUR WAREHOUSE**

## - SPECIAL OFFERING -

# 5 PAIR, #19 ga.

# NEOPRENE CABLE

**TOUGH ABRASION RESISTANT ★ AERIAL OR UNDERGROUND**

**COLOR CODED • SOLID TINNED COPPER CONDUCTORS • RUBBER INSULATED • UNUSED A-1—1,000 ft. LENGTHS ON SEALED NO-CHARGE STEEL REELS •**

*While Quantities Last*

Less than 3 cents per foot.

**$29.50** per 1,000 ft. REEL

**IN QUANTITIES OF 5 OR MORE REELS**
**Less Then 5 $32.50 ea.**
**ALL PRICES F. O. B. CHICAGO**

**REUBEN R. GRAFF CO.**
**6114 So. WENTWORTH AVE.**
**CHICAGO 21, ILL. NO7-6400**

**ORDER TODAY**

**TERMS: 25% DEPOSIT WITH ORDER. BALANCE C. O. D. RATED FIRMS: NET 10 DAYS**

# Index to ADVERTISERS


| | Page |
|---|---|
| Acme Visible Records, Inc. | — |
| Alphaduct Wire & Cable Co., The | 61 |
| Aluminum Company of America | — |
| American Chain & Cable Co., Inc. Page Steel & Wire Div. | — |
| Wright Hoist Div. | — |
| American Creosoting Corporation | — |
| American Electrical Heater Co. | — |
| American Gage & Mfg. Co. | — |
| American Steel & Wire Co. | — |
| American Telephone & Telegraph Co. | 46-47 |
| Anaconda Wire & Cable Co. | — |
| Ansonia Wire & Cable Co., The | — |
| Arrow Fastener Co., Inc. | — |
| Atlantic Creosoting Co., The | 75 |
| Automatic Electric Sales Co. | 12-13, 40-41, 73 |
| Bakelite Company | — |
| Baker Wood Preserving Co. | — |
| Bartlett Tree Experts | — |
| Bashlin Company, W. M. | — |
| Bell Telephone Laboratories, Inc. | — |
| Benner-Nawman, Inc. | 57 |
| Berry & Co., L. M. | — |
| Bethlehem Steel Co. | 45 |
| Biddle Co., James G. | — |
| Bishop Manufacturing Corp. | 67 |
| Blaw-Knox Company | — |
| British Insulated Callenders' Cables, Ltd. | — |
| Buckeye Telephone & Supply Co. | 76 |
| Burgess Manning Company | — |
| Burroughs Corp. | — |
| C&D Batteries, Inc. | 25 |
| Cabaniss-Pogue Co. | 75 |
| Cable Breather Corp. | 75 |
| Cable Spinning Equipment Co. | — |
| Calculagraph Company | — |
| Chance Co., A. B. | — |
| Chase Brass & Copper Co. | — |
| Cleveland Inst. of Radio Electronics | — |
| Colorado Fuel & Iron Co., The | — |
| Commercial Cord and Supply Co. | — |
| Communication Equipment & Engineering Co. | — |
| Consolidated Electrodynamics Corp. | — |
| Cook Electric Company | — |
| Copperweld Steel Co. | — |
| Crane, Inc., Carl C. | 75 |
| Cullom & Ghertner | — |
| Davis Construction Co. | — |
| Diamond Expansion Bolt Co., Inc. | — |
| Donnelley & Sons, R. R. | — |
| Dow Chemical Co., The | — |
| Du Pont de Nemours & Co., E. I. | — |
| Duo-Safety Ladder Corp. | 66 |
| Edmund Scientific Company | 71 |
| Elbe File & Binder Co., Inc. | — |
| Electric Specialty Co. | — |
| Empire Steel & Wire Corp. | 75 |
| Engineering Associates, Inc. | 75 |
| Everstick Anchor Co. | — |
| Exide Industrial Division— The Electric Storage Battery Co. | — |
| Fitchburg Engineering Corporation | — |
| Foley Construction Co., Robert E. | 75 |
| General Cable Corporation | 29 |
| General Insulated Wire Works, Inc. | 60 |
| General Machine Products Co., Inc. | — |
| General Telephone Directory Co. | Back Cover |
| Goodrich Chemical Co., B. F., The | — |
| Gorman-Rupp Company | — |
| Gould-National Batteries, Inc. | 16 |
| Graybar Electric Co. | — |
| Greenlee Tool Co. | — |
| Haley & Co., R. G. | — |
| Harris-McBurney Company | 74 |
| Henkels & McCoy | 75 |
| Highway Trailer Company | — |
| Hirsch Organization, Inc., Gustav | 67 |
| Holan Corp. | — |
| Holub Industries, Inc. | — |
| Homelite Corp. | — |
| Hubbard & Company | — |
| Indiana Steel & Wire Co. | 56 |
| Ingram-Richardson Mfg. Co. | — |
| International Business Machines Corp. | — |
| International Harvester Co. | — |
| Irwin Auger Bit Co. | — |
| Johns-Manville | — |
| Kander & Company, Allen | — |
| Katolight Corp. | — |
| Kearney Co., Jas. J. | — |
| Kellogg Switchboard & Supply Co. | 6-7, 36-37, 52-53 |
| Kennecott Wire & Cable Co. | — |
| Killoren Company | 75 |
| Klein & Sons, Mathias | 58 |
| Kleinschmidt Laboratories, Inc. | 79 |
| Koiled Kords, Inc. | — |
| Koppers Co., Inc. | 63 |
| Kwikkopy Company | 59 |
| Leich Sales Corporation | 8-9 |
| Lindsay Telephone Supply Co. | 64 |
| Line Equipment Sales | 76 |
| Lorain Products Corp., The | 5 |
| Loris Sales | 77 |
| Magnolia Chemical Company, Inc. | 74 |
| McCabe-Powers Auto Body Co. | — |
| McFarland Company, L. D. | 75 |
| McGrath Engineering, Inc. | 75 |
| Monsanto Chemical Co.— Plastics Div. | — |
| Morrison-Pelsue Co. | — |
| Mullen Construction Co. | 74 |
| Murphy Engineering Laboratories | 59 |
| Natco Corporation | 74 |
| National Pole & Treating Div. | — |
| National Standard Co. | 35 |
| National Telephone Supply Co. | — |
| Neubauer Manufacturing Co. | — |
| Neuses, Inc., P. K. | — |
| North Electric Company | 14-15 |
| Onan & Sons, D. W. | — |
| Orangeburg Manufacturing Co., Inc. | 51 |
| Osmose Wood Preserving Co. | 74 |
| Owens-Illinois | — |
| Page & Hill, Inc. | — |
| Phelps, Dodge Copper Products Corp. | — |
| Philco Corp., Gov't. & Industrial Div. | — |
| Piedmont Wood Preserving Co. | — |
| Plymouth Industrial Products, Inc. | 70 |
| Porcelain Products, Inc. | — |
| Porter, Inc., H. K. | — |
| Preformed Line Products Co. | 21 |
| Pressed & Welded Steel Products Co. | — |
| Prodelin, Inc. | 54 |
| Radio Engineering Products Ltd. | — |
| Radio Frequency Laboratories, Inc. | 56 |
| Ramset Fastening System | — |
| Raytheon Mfg. | — |
| Recordak Corp. | — |
| Reichhold Chemicals, Inc. | — |
| Reliable Electric Company | 69 |
| Remington Rand Div. | — |
| Rex Corporation, The | 49 |
| Roebling's Sons Corp., John A. | — |
| Rohn Manufacturing Co. | 60 |
| Roper Manufacturing Co. | — |
| Rolatape, Inc. | 62 |
| Runzel Cord & Wire Co. | — |
| S&G Manufacturing Corp. | — |
| Schauer Mfg. Co. | — |
| Seymour Smith & Sons, Inc. | 48 |
| Sherron Metallic Corp. | — |
| Sierra Electronics Corp. | — |
| Sloan, Cook & Lowe Co. | 75 |
| Stahl Metal Products | 63 |
| Stainless, Inc. | — |
| Stewart Bros. | 71 |
| Stromberg-Carlson Co. | 2-3, 75 |
| Superior Cable Corporation | — |
| Suttle Equipment Corporation | — |
| Taylor-Colquitt Co., The | — |
| Telectric Co. | 77 |
| T.E.I. Corp. | 75 |
| Tele-Muff Co. | — |
| Telephone & Power Supply Co. | 75 |
| Teletype Corp. | — |
| Tele-Wire Supply Co., Inc. | — |
| Telkor, Inc. | — |
| Templeton, Kenly & Co. | 70 |
| Thornhill Publishing Co. | — |
| Transandean Associates, Inc. | 55 |
| Truck Equipment Company | 71 |
| Tudor & Yager, Inc. | 75 |
| United Electric Controls Co. | — |
| U. S. Cable Constructors, Inc. | — |
| United States Independent Telephone Association | — |
| United States Instrument Corp. | — |
| United States Motors Corp. | 50 |
| United States Steel Corp. American Steel & Wire Co. | — |
| Creosote Division | 10-11 |
| Universal Controls Corp. | 36-37 |
| Utica Drop Forge & Tool Div. | — |
| Utility Body Co. | — |
| Utility Tool & Body Co. | — |
| Weikel Line Company | 75 |
| Western Electric Co. | — |
| Wheelock Signals, Inc. | — |
| White Motor Co., The | — |
| Whitney-Blake Co. | 65, 68, 72 |
| Williams Inspection Co., A. W. | 75 |
| Wiremold Co., The | — |
| Wyoming Valley Equipment Div. | — |
| Yates Construction Co. | 75 |
| York-Hoover Corporation | — |



**WESTERN REPRESENTATIVE: McDonald-Thompson, 625 Market St., San Francisco, Cal.; 3727 W. Sixth St., Los Angeles; Colorado National Bank Bldg., Denver, Colo.; National Bldg., Seattle, Wash.; 3217 Montrose Blvd., Houston, Tex.; 2010 S. Utica, Tulsa, Okla.**

# Today's courier sits at a Kleinschmidt keyboard

**The lightweight portable Kleinschmidt teletypewriter is a one-man communication center, transmitting and receiving printed communications at any location, under any conditions.**

The mobility of our modern Army demands the receipt of vital information instantly and accurately. There can be no delays, no uncertainty. Kleinschmidt teletypewriters and related equipment, developed in cooperation with the U.S. Army Signal Corps, speed teleprinted communications between outpost and command control, provide both sender and recipient with an identical original simultaneously. Looking ahead . . . planning ahead . . . setting the pace for almost 60 years has made the Kleinschmidt name synonymous with development and progress in the teleprinted communications field. Now the engineering skill and research facilities of Kleinschmidt Laboratories, Inc., are joined with those of Smith-Corona Inc, forecasting boundless new achievements in electronic communications for business and industry.

Pioneer in teleprinted communications equipment

**KLEINSCHMIDT LABORATORIES, INC.**

A subsidiary of Smith-Corona Inc • Deerfield, Illinois

# Directories make more money

## *with our "Revenue Men" on the job*

OUR DIRECTORY "Revenue Men"—working from 32 strategically located sales offices—providing the Independent Telephone Industry with a flexible and highly skilled telephone directory organization, are equipped to render a Complete and Quality Directory Service.

These specialists, through the use of up-to-the-minute knowledge of the market—proper sales training—imagination—ideas—leadership—and hard work, produce results which more than measure up to accepted directory revenue standards.

Yes, the "Yellow Pages" revenues,in the more than 800 directories we now produce for large and small Independent Telephone Companies, prove the statement "DIRECTORIES MAKE MORE MONEY WITH OUR 'REVENUE MEN' ON THE JOB."

Write or phone our office nearest you for our Complete Directory Service Plan.

## GENERAL TELEPHONE DIRECTORY COMPANY

1800 Oakton Street • DES PLAINES, ILLINOIS • VAnderbilt 4-2164

*Divisional Sales Offices:*

COLUMBIA, Mo. • 811 Cherry Street • Gibson 2-6907
DURHAM, N. C. • 108 E. Parrish Street • Tel.: 5133
ERIE, Penna. • G. Daniel Baldwin Building • Tel.: 2-4187
FORT WAYNE 2, Ind. • 229 E. Berry Street • Eastbrook 3477
HONOLULU 14, Hawaii • 1236 Waimanu St. • Tel.: 504-231
LEXINGTON, Kentucky • 157 Walnut Street • Tel.: 4-7626
LONG BEACH 15, Calif. • 1775 Ximeno Ave. • GEneva 3-7441
MADISON, Wisconsin • Tenney Building • Alpine 7-1667
MANILA, Philippine Islands • P. O. Box 673
SAN ANGELO, Texas • 110 South Taylor St. • Tel.: 6738
SPOKANE, Wash. • South 11 Monroe • MAdison 4-4336
SPRINGFIELD, Ill. • Myers Bros. Building • Tel.: 8-3425